

# *Physical Thinking in College Innovation and Entrepreneurship Education*

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**Abstract:** With the continuous development of the economy and the progress of the times, the society has put forward higher requirements for the talents cultivated by universities. Innovative and entrepreneurial education in colleges and universities is a hot topic in Chinese education in recent years. How to cultivate high-quality talents with entrepreneurial innovation consciousness, spirit and ability is an important topic facing college education. However, the innovation and entrepreneurship of hemoglobin in colleges and universities is not only carried out from university education, but also more learn to use. The education of the university is different from the middle school. The middle school education is all-inclusive. The students form a fixed thinking and will affect the life. Therefore, the author talks about the innovation and entrepreneurship education in colleges and universities in this paper. It is hoped that it will also have guiding and reference significance for effectively promoting university curriculum teaching reform and cultivating innovative talents in colleges and universities.

## 1. Introduction

In today's world of economic globalization, competition among countries is becoming increasingly fierce, especially in high-tech competition. The occupation of the commanding heights of science and technology has become the consensus of all countries. From the development history of developed countries such as Britain, France, Germany and the United States, it is not difficult to see that the level of physical education determines the technological strength of a country. University mechanics is the most basic discipline of physics. At the university level, the quality of university mechanics learning directly affects students' subsequent curriculum and future professional development. At present, there are many researches on the teaching and learning of university mechanics, most of which focus on teaching concepts, teaching strategies or methods, learning methods, and evaluation. There are many researches on thinking methods, but they are mainly limited to the characteristics and application research of scattered thinking methods. There is a lack of analysis of the whole university's mechanical thinking system and the study of students' thinking ability-based learning methods.

## **2. The Scientific Connotation of Innovation and Entrepreneurship Education in Colleges and Universities**

Innovative entrepreneurship education, as an educational concept and form of education in the era of knowledge economy, aims to cultivate high-quality new composite talents with certain innovation and entrepreneurial consciousness, innovative entrepreneurial thinking, innovative entrepreneurship and innovative entrepreneurial personality. At present, there are three kinds of understandings about the connotation of innovation and entrepreneurship education in domestic academic circles:

### **2.1. Equivalent Innovation and Entrepreneurship Education to Innovative Education**

Innovative education will have different interpretations from different perspectives. Some scholars believe that innovative education should aim at cultivating students' innovative spirit and innovative ability, so that students can be confident in their ability, independent in action, and better able to regulate the emotions, high level of achievement motivation, self-motivation, high frustration tolerance, no blind obedience, like to use their own point of view to judge problems, have a lasting desire for things, have a sense of humor. Some scholars believe that innovative education refers to the use of the positive impact of genetics and the environment, giving play to the leading role of education, fully mobilizing the subjective initiative of students' understanding and practice, focusing on students' subjective innovation consciousness, innovative spirit, awakening and development of innovative skills, forming an innovative personality to adapt to the needs of the future society and to meet the full development of the student body. Other scholars believe that innovative education is a new educational concept that emerges with the rise of the knowledge economy. It requires education to be creative and cultivate students' innovative consciousness, innovative ability and innovative personality.

### **2.2. Equivalent Innovation and Entrepreneurship Education to Entrepreneurship Education**

Entrepreneurship education is an educational model aimed at cultivating students with entrepreneurial spirit, entrepreneurial awareness, basic quality of development and entrepreneurship, and continuous improvement of entrepreneurial comprehensive ability. It is a lifelong education that continuously improves and deepens people's quality. It is not just a professional skill education. The core of entrepreneurship education is innovative education. It aims to promote the spirit of human beings, explore the creative potential of people, and promote the harmonious development of human personality. In a broad sense, entrepreneurship education is to cultivate a pioneering individual. In a narrow sense, entrepreneurship education is an educational activity that trains students to have entrepreneurial awareness, quality, and skills. It is also a way to train students to how to adapt to social survival and development, how to improve their abilities, and how to start their own businesses. Entrepreneurship education in colleges and universities is a long-term plan to adapt to the development needs of the knowledge economy, thereby broadening the employment path of students and building a national innovation system.

### 2.3. Regard Innovation and Entrepreneurship Education as A Combination of Innovative Education and Entrepreneurship Education

Innovative education has a very close relationship with entrepreneurship education. Entrepreneurship education requires not only the methods and ideas of innovative education, but also the results of innovative education. However, the purpose of entrepreneurship education is not simply to acquire new thinking and new methods, but to cultivate students' ability to apply new thinking and new methods to put the acquired knowledge into practice. Innovative education attaches great importance to cultivating students' respect for authority but not superstitious authority, respecting the reality but not only sticking to the actual spirit, emphasizing the training of innovative thinking and innovative methods.

Innovation and entrepreneurship education aims to cultivate talents with basic entrepreneurial qualities and pioneering personality. It is not only to foster the education of students in the entrepreneurial spirit, entrepreneurship, and innovation and entrepreneurship, but to face the whole society. For those entrepreneurs who are planning to start a business, have started a business, and have successfully started a business, they will carry out education in innovative thinking and entrepreneurship training in stages and levels. Innovative entrepreneurship education is essentially a practical education. Its basic characteristics are innovative, creative and practical.

### 2.4. Genetic Algorithm for the Optimization of Teaching Strategy for Innovation and Entrepreneurship

Teaching strategy optimization is also a crucial link in the field of innovation and entrepreneurship education. How to use computer technology to optimize innovation and entrepreneurship teaching strategies to overcome the subjectivity and randomness of traditional optimization methods is the application of computers in the field of innovation and entrepreneurship education. A new aspect of research. Using genetic algorithms to optimize teaching strategies can make teaching strategies evolve and optimize with changes in teaching content and teaching objects. In the set R of the evaluation sample values of the class, weighted by the average of n individuals, (sample Function of standard deviation) in order to obtain a more appropriate fitness.

$$\sigma = \sqrt{\frac{\sum_{i=1}^n (R_i - \bar{R})^2}{n}} \quad (1)$$

$$E = \begin{cases} \bar{R}(1 - \frac{\sigma}{100}) & (\sigma \leq 10) \\ 0 & (\sigma > 10) \end{cases} \quad (2)$$

## 3. Physical Creative Thinking Analysis

### 3.1. Thinking and Problem Solving

Thinking is a kind of special organic energy that the human brain has. It is the general and

indirect reflection of the human body's essential attributes of objective things and the inherent relationship between things. Thinking is the internalized action (distinguished from the outside In the behavior of the action). The basic ways of thinking include: analysis and synthesis, comparison and classification, abstraction and generalization, induction and deduction, analogy, and so on. According to different thinking materials (that is, objects of thinking processing) and different activities in brain regions, it is generally believed that there are only three basic forms of human thinking: image thinking, intuitive thinking, abstract thinking, and creative thinking is contained in three basic forms. According to research needs and different classification methods, thinking can be classified into conventional thinking and creative thinking. Creative thinking is the fusion of sensibility and rationality.

Since thinking is an internalized action, the operation of this internalized action needs to depend on the specific object problem. Without specific problems, it is impossible to provide an operational object for thinking. Only when a problem arises can the thinking process be stimulated. Therefore, thinking starts with problems, travels with problems, and ends with problems. Therefore, cultivating innovative thinking must be based on research and innovation in problem solving and problem solving.

As we all know, physics is the foundation of all natural sciences. It is a science that combines observation, experimentation, and physical thinking. It is also a science with a rigorous theory and a methodological nature. In the long-term development of physics, physics has formed a set of research problems and solutions to problems, affecting people's ideas, viewpoints and methods. From the characteristics of physics and physical thinking, it can be seen that the physics subject contains favorable factors for the cultivation of creative thinking. Therefore, it is an ideal way and strategy to solve students' creative thinking ability based on physical problems. Through the solution of the problem, not only can students help to construct a knowledge network, but also help students to obtain the process and method of solving problems, experience positive emotional attitudes and values, and cultivate the ability to solve physical problems and the formation of scientific interests.

### 3.2. Physical Creative Thinking

Innovative thinking is a thinking ability that changes the original structure of a thing or applies an existing concept to a new thing based on existing knowledge. It is the goal pursued by educators to cultivate students' creative thinking ability in school education.

Physical creative thinking refers to the physical thinking activities of physical thinking results with novelty, originality, purpose and value. First of all, the product of thinking must be novel and original. Of course, the novelty and original standards are relative. For adults and children, it is different for learning physics and research physics. Secondly, the product of thinking must conform to the purpose of physical thinking and have certain value. Physical creative thinking includes two aspects: firstly, re-arranging and combining existing physics knowledge to create new knowledge and image; secondly, breaking through existing physics knowledge and proposing new insights, ideas, ideas, and viewpoints.

Physical problems are in the context of physics, linked to a large amount of expertise, and are subject to knowledge-rich areas. There are many different rules for solving problems in areas with poor knowledge. With the deepening of psychological research on the solution of physics problems, the research on cognitive models of physics problems has achieved relatively satisfactory results. The cultivation of creative thinking ability is closely related to the cultivation of students'

individuality. Based on the teaching concept of student personality development, the flexible teaching mode of developing academic and individual personality is proposed.

#### **4. Innovative Entrepreneurship Education from the Perspective of Physical Thinking**

##### **4.1. Use Physics Knowledge to Guide Entrepreneurial Direction**

Physics is the most advanced discipline in the natural sciences, and the most mysterious and practical subject in the natural sciences. The physics teaching in the middle school gives us the foundation. The physics teaching at the university level gives us more in-depth study, which enables us to have the ability to face the challenges of society. As a teacher, it is a practical idea to guide students to start a business from the perspective of physics. For example, let students study how to improve the efficiency of internal combustion engines. Currently, the fuel efficiency of automobile fuels is generally 30%. Even cars in Japan and Germany cannot exceed 50% efficiency, which means that plenty of petrol is consumed in vain. Through this fact, students can be guided to conduct research in this area and start entrepreneurship in this area. Similarly, there are new materials, knowing that silver has good conductivity and is far superior to copper. However, in order to save costs, copper and aluminum are the main conductive materials on the market. Students can use electromagnetism and resistance. Knowledge, research and development of new materials, this is also a business direction, are applied to the thinking of physics.

##### **4.2. Using Physics Reverse Thinking to Carry out Entrepreneurship Education**

The reverse thinking in physics thinking is actually deducing the past and deducing the past. In fact, it is based on the current status quo to carry out inverse reasoning. For example, the prevalence of e-commerce shopping is not only because of the development of electronic networks, but also because of the pressure of life and the intensity of it. Many people are too lazy to go shopping in the mall, and strive to be simple, fast, and save time and effort. Therefore, the conclusions from the reverse reasoning can be applied to other fields, such as the prevalence of the take-away industry, which is to discover such a potential fact, to start a business and open up the market. At present, China's economy is developing at a high speed, and road congestion is a common problem. It is very difficult to go out. Sharing bicycles is focused on solving people's "last mile travel problem". The main reason is that reverse thinking finds problems. Therefore, when teaching, the teacher can focus on cultivating students' thinking in reverse thinking and seeing the essence through phenomena. When necessary, it is entirely possible to train and examine students' thinking skills through exercises.

##### **4.3. Using Physics to Learn from One Another**

The "draw inferences about other cases from one instance" of physics is the migration of one thing to another, and the theoretical basis of application is the same. For example, in the case of e-commerce companies, after the success of the Ali Group, many companies are similar, such as: Amazon, Jingdong, Vipshop, Jumei and other e-commerce platforms. Although the above e-commerce model is different from Ali, it is based on Ali's successful experience. They all appear in the economic market in the form of inversions. Even if many companies attack Ali and try to surpass Ali, it is undeniable that Ali is the originator of Chinese e-commerce. Even if college graduates go out to start a business, they can't open up a new field, but at least they can think about

it in a known field.

#### 4.4. Survey Content and Method

In order to better understand the current situation of the combination of physics history and creative thinking education in middle school physics teaching, the author collected 226 copies of teaching designs for the open courses of innovation and entrepreneurship education in H colleges. Among them, 121 new teaching designs and 105 review teaching designs. These teaching designs are authentic and representative. In this article, the content analysis method will be used to analyze and organize 121 new teaching designs. The content includes whether the history of physics is introduced in innovation and entrepreneurship education, whether there is a combination of physics history and creative thinking education, whether there are other factors combined with physics thinking education and so on.

Student survey: The questionnaire surveyed 100 students, focusing on the use of physical thinking in the teaching of innovation and entrepreneurship education used by teachers to investigate teachers' suggestions and ideas on optimizing teaching strategies for innovation and entrepreneurship education. At the same time, the content of the interview also involves their attitudes and views on "optimization of teaching strategies".

#### 4.5. Involving Factors in Innovation and Entrepreneurship Teaching Design

Among 121 new teaching designs, the survey results of whether there is design physics thinking in innovation and entrepreneurship education courses are shown in Table 1. Among them, 28 use physics historical materials, 45 use physical science methods, and use There are 37 copies of Chinese scientists' methods.

*Table 1. Factors involved in the teaching design of innovation and entrepreneurship*

Involving factors	Number of copies	proportion
Historical Materials of Physics	28	23.14%
Physical science method	45	37.19%
Chinese scientist method	37	30.58%
History of Physics and Physics	7	5.79%
thinking	4	3.31%

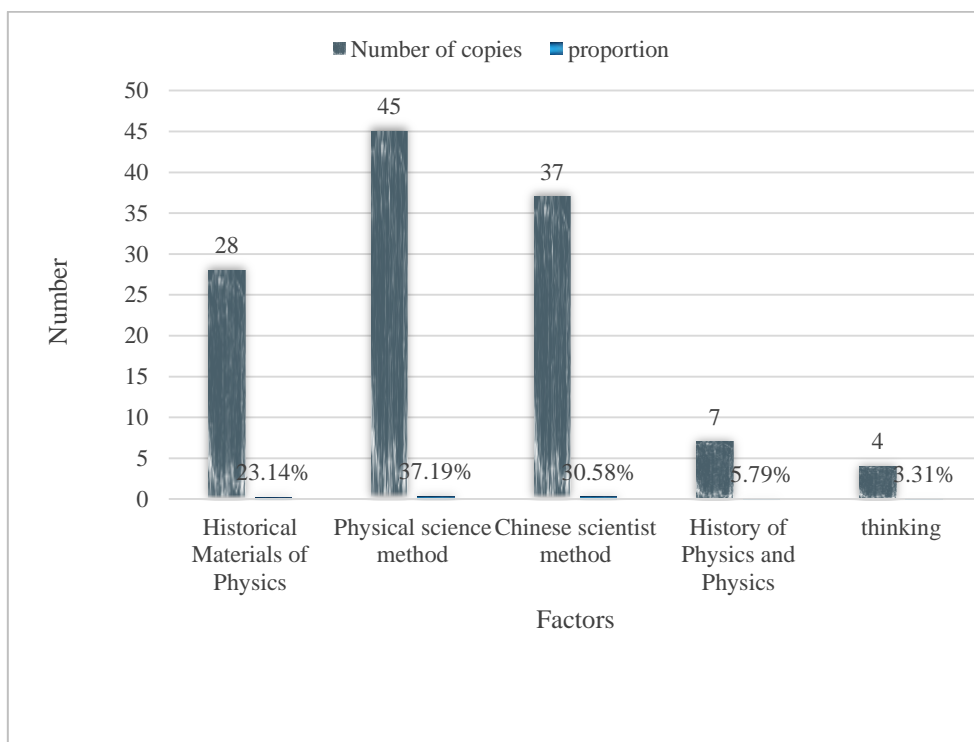


Figure 1. Factors involved in the teaching design of innovation and entrepreneurship

#### 4.6. Innovative and Entrepreneurial Education Teaching Students' Acceptance of Physical Thinking

By investigating to students "In what form do you prefer to show physical thinking in innovation and entrepreneurship education", the results are shown in Table 2: I hope to tell the physicist's life introduction accounted for 7%, I hope to intersperse in innovation and entrepreneurship education Major discoveries made by scientists accounted for 20%.

Table 2. Innovative and entrepreneurial education teaching students' acceptance of physical thinking

the way	Number of people	proportion
Introduction to the life of a physicist	7	7%
Historical evaluation of physics	29	29%
Scientist's major discovery	41	41%
Interesting facts about scientist's life	20	20%
other	3	3%

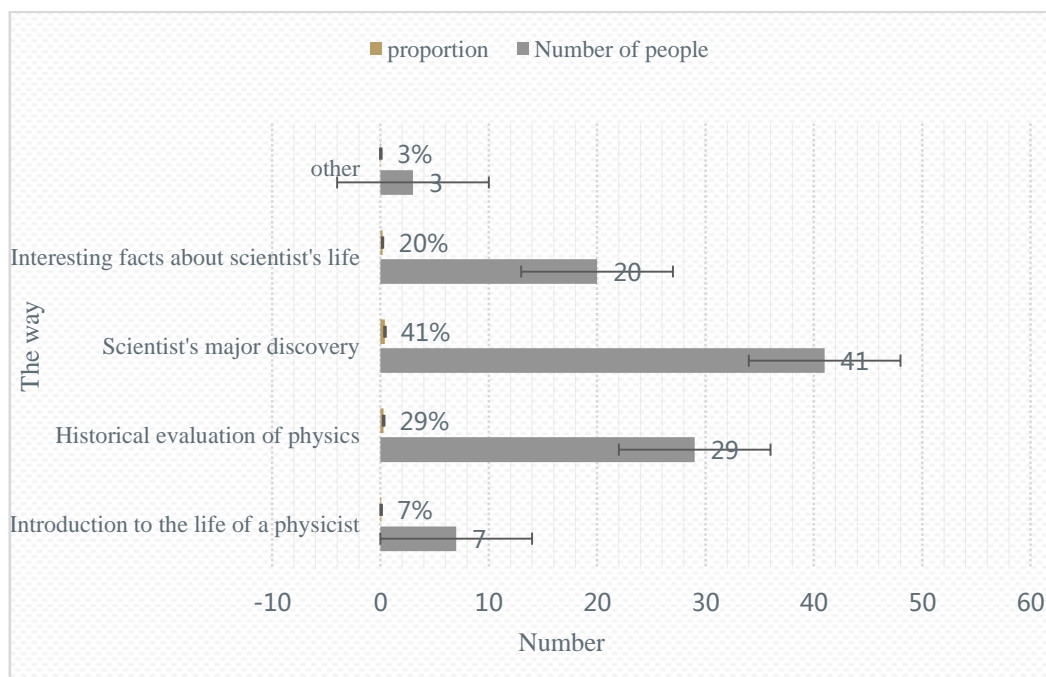


Figure 2. Innovative and entrepreneurial education teaching students' acceptance of physical thinking

It can be seen from Figure 2 that students prefer to learn physical thinking by telling scientists' major discoveries in innovation and entrepreneurship education courses. This is because teachers indicate to students the key creative thinking factors for scientists to make major discoveries and breakthroughs. Let students feel the power and beauty of physical science thinking, which is conducive to perfecting students' cognition and creative thinking structure, and is conducive to cultivating students' creative thinking and ability in innovation and entrepreneurship, so as to carry out innovation and entrepreneurship activities in future study and life.

## 5. Summary

Physics is accompanied by the secondary school stage of every college student. Although the profession is different, the study of this course is gradually abandoned. However, it does not mean that this course has nothing left and nothing is used. As a basic course of exam-oriented education, it has the meaning of existence. For example, in innovation and entrepreneurship, it is often the use of physics thinking and knowledge to solve problems and educate innovation and entrepreneurial knowledge.

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## Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.



## Conflict of Interest

The author states that this article has no conflict of interest.

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