

Discussion on the Reform of College Physics Course Teaching

Chunjie Feng^{1,2}

¹*Jos é Rizal University 80 Shaw Blvd Mandaluyong City 1550, Philippines*

²*Anshun University, No. 25 Xueyuan Road, Development Zone, Anshun, 561000, China
872180748@qq.com*

Keywords: University; Physics teaching; Reform; Discuss

Abstract: As a crucial subject in science and technology schools, college physics plays an important role in the future development and learning of college students. Physics learning is not only limited to the study of some professional knowledge, but also to improve students' ability to analyze and deal with problems. Therefore, college physics teaching should take arousing students' learning interest as the learning goal, and pay attention to the cultivation of students' innovative thinking ability and comprehensive ability. In response to the current tide of university physics course teaching reform and innovation, relevant universities should consider the current situation of school physics course reform and carry out physics teaching reform in various ways. By analyzing the problems existing in the current stage of physics teaching reform, this paper puts forward the significance of university physics reform, and provides many constructive opinions for the future development of physics reform. It is expected to give some suggestions for colleges and universities to improve the level of physics teaching and arouse the enthusiasm of many students for physics learning.

1. Introduction

As a very important subject, college physics course can not only broaden students' thinking ability, but also improve their ability to study difficult problems, and cultivate their innovative thinking ability and spirit. With the rapid development of the field of physics, the traditional university physics teaching content can no longer fully meet the needs of talent training, and the teaching content needs to be constantly updated and improved to better meet the needs of students. The traditional university physics teaching method focuses on the transmission of theoretical knowledge, but lacks a teaching method combined with practical application. Therefore, it is necessary to further improve the teaching quality of physics in colleges and universities. However, the present situation of college physics teaching is not optimistic, mainly because of the imbalance between teaching content and teaching quality. In addition, with the annual expansion of the number of college students in China, domestic higher education has already changed from the original elite education to civilian education. In response to this situation, how to integrate physics education in colleges and universities into this transformation, while improving students' learning initiative, integrate the content of the curriculum with the development level of physics, and make it the most

concerned point for many physics teachers in colleges and universities.

2. Analysis of the existing problems in the current university physics reform

Nowadays, the reform and innovation of education and teaching is still developing continuously, which provides excellent external standards for the reform and innovation of physics teaching in colleges and universities. However, everything exists both good and bad. Just like the philosophical dialectics we learn, everything can be divided into two. In addition to various useful standards, the reform and innovation of physics teaching in colleges and universities also encounter many bad standards, which invisibly improves the difficulty coefficient of reform and innovation. To sum up, the following problems mainly appear in the reform and innovation of physics teaching in colleges and universities:

First of all, the reform and innovation of college physics teaching is far from enough attention. With the continuous development of colleges and universities, the teaching time of physics in colleges and universities becomes more and more unstable. This shows that physics teaching in colleges and universities has not aroused the full attention of universities. It also does not focus on the degree of learning and learning outcomes. At the same time, students pay far less attention to it, which is mainly reflected in the allocation of time and energy. In reality, many students in universities prefer a variety of art subjects, and few are willing to concentrate on physics subjects. The reason why such a phenomenon occurs is mainly caused by the lack of understanding of physics by teachers and students. Many people think that physics is a less practical subject, and it is not commonly used in daily life. In addition, it is difficult to teach physics, so many students' learning of physics is slowly reduced.

Secondly, the teaching consciousness is outdated, the classroom teaching method is old. In today's colleges and universities, physics teaching still uses the traditional "transfer" teaching method. Physics teaching in colleges and universities usually only pays attention to the teaching of students' professional knowledge, but neglects the cultivation of other physics skills and qualities. Therefore, in the physics teaching classroom, or to the teacher's explanation as the dominant, the students listen to the phenomenon. And in the aspect of physics experiment teaching, the experimental method is outdated and simple. Under the influence of such experimental teaching, students could not form a deep interest in physics experiments, let alone love them. The occurrence of the above problems is by no means accidental, but caused by traditional teaching methods and their old classroom teaching methods. Therefore, in the reform and innovation of physics teaching, if we want to change the current situation, we still need to spend time on teaching awareness and classroom teaching methods.

Third, the teaching content is backward, and the experimental standards still need to be improved. Nowadays, with the continuous progress of information technology, the teaching methods are also constantly changing, which requires corresponding changes in the relevant teaching content. However, as far as the current teaching of physics is concerned, the transformation of teaching content is not as strong as that of scientific and technological progress. In other words, the current teaching content of physics is far from keeping up with the development of science and technology. What's more, there are very few modern physics content and other cutting-edge content. Therefore, if the teaching content is not updated, it will seriously affect the process of physics teaching reform. In addition, the experimental standard deviation is also a key influencing factor. Therefore, we should also pay attention to the timely replacement and adjustment of relevant experimental equipment. Only in this way can we ensure the accuracy of physical experiments and avoid some safety accidents.

3. The significance of college physics teaching reform

With the rapid development of the society, talent has become more and more important in the society. How to improve the competitiveness of talents has become the most important issue to pay attention to. Talent is the key force for social development, and the standard of talent required by society is constantly improving, which requires contemporary college students to accumulate more knowledge before graduation, but also to constantly improve their own ability of independent innovation, so that they become comprehensive talents. Therefore, in the process of college physics teaching reform, in order to ensure the successful training of independent innovative talents, traditional classroom teaching methods must be eliminated. Through the reform and innovation of physics teaching in colleges and universities, it builds a good atmosphere for students to learn physics professional knowledge and a good platform for students to learn physics professional knowledge. It encourages students to actively participate in various activities, arouses their active initiative in learning physics, and promotes the reasonable cultivation of their divergent thinking and independent innovation ability. Therefore, the reform and innovation of college physics teaching have the key significance to the cultivation of independent innovative talents.

4. The basic principles of college physics teaching reform

The reform and innovation of college physics teaching is a complicated undertaking, which not only involves the teaching design and teaching scheme of teachers and physics course itself, but also involves the future development of students and the interrelation with other courses and so on. Therefore, to do a good job in the reform and innovation of college physics teaching, we must adhere to the following principles:

4.1 Principle of quality education

The key to university education is to cultivate highly-quality applied technical talents who can adapt to the front line of production, service and management [1]. In today's society, in response to the rapid development of science and technology and the continuous enrichment of professional knowledge, physics teaching should not only attach great importance to the education of basic professional knowledge of physics, but also spend more time on improving students' comprehensive ability, and transform professional knowledge education to quality education. Only in this way can we keep up with the pace of modern social and economic development.

4.2 Principles of structural optimization

We should not only get rid of the teaching that does not conform to the educational characteristics of the development of the university, and the rigid teaching method, or the teaching that only takes the subject as the core and pursues perfect professional knowledge too much, so as to affect the cultivation and practice of professional ability, but also oppose the teaching of exam-oriented education, which is not taught outside the scope. The existence of the above problems will seriously affect the reform and innovation of physics teaching[2]. Therefore, it is necessary to design a reasonable university physics teaching management system in accordance with the norms of cultivating highly qualified talents integrated into the regulations of social and economic development, properly handle the relationship between physics and specialized courses, key points and non-essential points, theoretical courses and experimental courses, courses and teaching methods and other levels. To improve the comprehensive effectiveness of college physics teaching.

4.3 Principles of sustainable development

At present, social development and scientific and technological development are getting faster and faster, and the regulations on talents are getting higher and higher. A highly-liked application-oriented talent should not only have a solid theoretical foundation and skilled technical application ability, but also have strong self-study ability and technical innovation ability. Nowadays, many college graduates generally have such a problem - that is, the theoretical foundation is relatively weak, the lack of self-study ability and independent innovation ability, and the stamina of future development is seriously insufficient. Therefore, in college physics teaching, teachers must change their educational concepts, spend time on cultivating students' sustainable development, so that students can grasp appropriate learning methods and thinking methods, and lay a good foundation for their sustainable development.

5. Path Analysis and Research of University Physics Teaching Reform

5.1 Create a scientific teaching content system

For physics, it is mainly divided into two parts, one is the fundamental part, the second is the frontier part. Such as electromagnetism, mechanics and other content, belong to the basic content, this part of the foundation is in the process of physics teaching has played a very key effect. And some cutting-edge content such as superconductivity and laser is the part that develops students' thinking. The textbook content of major university physics can includes two aspects: classical physics and modern physics. Classical physics mainly includes: classical mechanics, heat, electromagnetism, optics and so on; Modern physics mainly includes: special relativity mechanics basis, quantum mechanics basis and so on. However, at present, there is still a lack of a specific division of physics courses in colleges and universities. Affected by it, there are also some repetitive courses in physics courses in colleges and universities. But in this case, it is difficult to stimulate students' enthusiasm for learning. Therefore, in the process of the reform and development of physics teaching, it is necessary to establish a scientific and reasonable curriculum structure. It is necessary to moderately reduce some basic physics content and add some cutting-edge physics content in time. Only by adding the difficulty of the teaching content can we promote the further improvement and development of the teaching content. In a word, it is necessary to create and improve a scientific teaching content system according to the requirements of society and its teaching practice activities.

5.2 Use the power of the Internet to improve classroom teaching methods

As confirmed by practical activities, improving classroom teaching methods is a key measure to promote the reform and innovation of physics teaching. In reality, various reasonable methods can be used to improve classroom teaching methods. For example, the use of the power of the Internet is a very critical one. In order to achieve this goal, we should do the following things: First, we should increase the application range of multimedia technology in physics teaching. Due to the influence of "transfer" classroom teaching method, college physics teaching is difficult. At the same time, college physics teaching also encountered the problem of more content, less time. If we want to deal with these problems reasonably, we must rely on the power of multimedia. Compared with other technical methods, multimedia technology integrates text, image and video, which is also the most ideal way in college physics teaching [3]. Therefore, in practical activities, it is necessary to further improve the application of multimedia technology and improve the effect of classroom teaching. Secondly, physics teaching should be carried out through the Internet on campus.

Nowadays, universities are networked, which lays a good foundation for the development of physics. Students can access all kinds of cutting-edge physics related professional knowledge or information through the campus Internet. At the same time, it can also explain various difficult problems, improve self-learning ability and physics learning level. Therefore, in physics teaching practice, we should give full play to the influence of campus Internet, so as to improve physics teaching guidance and discussion.

5.3 Further improve the teaching level of physics experiments in colleges and universities

From the perspective of theory, the teaching of physics experiments is a key component of physics teaching. And the two show a complementary relationship. Therefore, if we want to improve the level of physics teaching reform and innovation, we must improve the level of physics experiment teaching. First of all, we should improve the teaching content of physics experiments and improve students' independent innovation ability. At the level of experimental teaching content, the design scheme should be moderately improved. In addition, in the process of physics experiment teaching, teachers should encourage students to actively answer questions and improve their ability of independent innovation in answering. At the same time, the physics laboratory should be open to students, so that students can freely enter and do experiments. In the long run, students can stimulate the initiative of physical learning and improve their comprehensive ability through their own experiments.

5.4 Improve the teaching quality of teachers

At present, colleges and universities are created and developed on the basis of elite education. The management cadres and teachers of the school themselves are the products of elite education [4]. In order to cultivate students' application ability, it is necessary to improve teachers' understanding and ability first. Therefore, physics teachers in colleges and universities should not only have profound knowledge and serious academic attitude, but also they have social practice and application ability. Only in this way can we better cultivate application-oriented independent innovative talents. This stipulates that teachers should always maintain the psychological state of learning, use holidays and extracurricular time to participate in learning or training, continuously fill professional knowledge, and keep pace with the development of science and technology. At the same time, we should also continue to improve our own application ability, such as encouraging teachers to go to the enterprise for temporary training, carry out school-enterprise collaborative work, the company's entry into the campus, which not only cultivates the teacher's practical activity ability, but also improves the teacher's application-oriented understanding.

5.5 Implement multi-dimensional assessment methods

In the traditional teaching methods of universities, the physics teacher's evaluation of students' learning is often one-sided, relying only on one paper to test students' mastery of college physics knowledge. Therefore, students only pass the relevant assessment through simple rote memorization, which is very unfavorable for students' development. It not only severely suppressed their enthusiasm for studying physics and made students lose interest in learning physics, but also seriously affected the process of physical reform. In this case, the traditional evaluation method should be changed, which can be evaluated from a variety of methods such as oral analysis ability detection, technical application of small papers, work display, experimental operation skills detection and examination paper detection. Through such an evaluation method, it can promote the development of students in many aspects, and learn relevant professional courses. It has the effect

of doing twice the result with half the effort [5]. This multi-faceted evaluation method can promote students to actively learn their own professional knowledge, cultivate their own comprehensive ability, so as to improve the ability of practical activities and practical operation.

6. Conclusion

The teaching reform of university physics courses will be a long-term and testatory task, and it is also the most important part of the future development path of colleges and universities in China. Under the background of new curriculum reform, college curriculum as a basic course for students is imperative under the trend of future reform. The new teaching concept requires emphasis on the concept of educational quality. In this reform and innovation work, we must adhere to the mentality of being serious, meticulous, scientific and seeking truth from facts, attach great importance to the comments and scientific research at all stages of teaching, and scientifically study the appropriate teaching methods of each school according to the actual situation of each university, and cultivate new talents with the characteristics of the school and suitable for future development.

References

- [1] Li Hongrong, Wang Xiaoli, Tian Boming, et al. *College Physics Teaching Reform aiming at Training Innovative Talents* [J]. *College Teaching of China*, 2013(08):19-21.
- [2] Li Aixia, Ye Liu, Zhang Ziyun et al. *Modern physics experiment teaching reform and the Cultivation of College Students' Innovation Ability* [J]. *Laboratory Research and Exploration*, 2010(04):77-78. (in Chinese)
- [3] Zhao Shujun. *Exploration and practice of university physics teaching reform under the background of "Excellence Plan"* [J]. *Journal of Heilongjiang Institute of Engineering (Natural Science Edition)*, 2014(04):78-80.
- [4] Hu Nan, Li Ruifeng, Liu Qin. *Exploration on the reform of university physics examination* [J]. *Journal of Chongqing Institute of Technology*, 2015(05): 110-112.
- [5] Wang Fan, Cui Lei, Yang Lijuan. *How to Adapt college Physics Teaching Reform to the Training of Applied Talents* [J]. *Physics Bulletin*, 2010(10): 21-23.