

# *Reform of College Physics Instructional Mode under the Background of Internet+*

Xiaomei Wu\*, Yanxiang Gong

*School of Physics and Electronic Engineering, Taishan University, Taian City, Shandong Province, 271000, China*

*\*Corresponding author: wuxiaomei-71@163.com*

**Keywords:** Internet, Physics course, Instructional mode

**Abstract:** With the deepening of curriculum reform, various new instructional methods and methods have been introduced into the teaching of college physics, which has played a positive role in students' effective learning. The rapid growth of Internet technology not only challenges the traditional instructional mode, but also provides opportunities for the reform of instructional methods. In order to meet the individualized learning needs and growth rules of contemporary college students, this paper, under the guidance of constructivism learning theory, ubiquitous learning theory, autonomous learning theory and deep learning theory, analyzes the reform strategies of college physics instructional mode under the background of internet +. In today's "internet +" environment, we should fully grasp the opportunity to promote the teaching reform of "College Physics" and improve the disadvantages of traditional instructional mode, so as to achieve the purpose of improving classroom management and teaching effect, and make full use of Internet resources to enhance students' scientific research and innovation ability and comprehensive quality, so as to lay a solid foundation for their future study and life.

## 1. Introduction

"College Physics" is one of the important compulsory courses in the basic teaching of science and engineering colleges, and its teaching goal is mainly reflected in cultivating students' scientific literacy and comprehensive ability. In the study of "college physics", it will involve physical science, life science, information science, material science and so on, so the whole learning stage of college physics is actually a systematic training process for students' logical thinking, abstract thinking and other abilities, which will promote their good development in the field of natural science in the future [1]. The rapid growth of mobile internet technology has brought great impact on the traditional classroom instructional mode of "lack of dialogue", which is teacher-centered, how to teach as the main line and based on teaching materials and teaching experience [2]. Physics, as a discipline that studies the basic structure, motion form, interaction and transformation law of matter, is the research foundation of all other natural sciences and engineering technologies [3]. As the carrier of imparting physics knowledge and cultivating physics thoughts, college physics course is an important basic course in universities of science and technology. Rational use of online teaching and design of more flexible and open instructional mode can not only effectively improve

students' learning efficiency, but also cultivate students' ability to think and analyze problems independently [4]. When teachers carry out college physics teaching, they need to start with the basic content and explain a vivid and vivid teaching space for students.

In the information age where the Internet is ubiquitous, how to fully and reasonably use Internet resources to mobilize students' enthusiasm for learning and change passive acceptance into active exploration and even enjoy it is a new topic that educators need to study and explore [5]. The popularization of the mixed instructional mode of Internet and education will have a profound impact on teachers' "teaching" and students' "learning". Learning style shows many new features: they don't like sedentary study for a long time, are not used to reading boring textbooks, like participatory and experiential learning methods, and are used to graphic resources with moving pictures [6]. Front-line teachers should conform to the development trend of the times and actively explore the reform and innovation of instructional mode under the background of internet + [7]. Through the reform of teaching content and instructional methods, it has always been the unremitting pursuit goal of educators to better realize the teaching purpose, achieve the expected teaching effect, cultivate students' physics thoughts and improve their comprehensive quality and scientific research and innovation ability [8]. In order to meet the individualized learning needs and growth rules of contemporary college students, this paper, under the guidance of constructivism learning theory, ubiquitous learning theory, autonomous learning theory and deep learning theory, analyzes the reform strategies of college physics instructional mode under the background of internet +.

## **2. The significance of "Internet +" college physics teaching reform**

Compared with the traditional instructional mode, the instructional mode of "internet +" has made a great breakthrough, which can better meet the learning needs of college students and belongs to the development trend of the future education industry. In the traditional teaching environment, learning effect is directly related to classroom concentration and memory ability, while in the new learning environment in internet +, the cultivation of ability and quality has attracted more and more attention of educators [9-10]. From the perspective of social management, Internet thinking represents transparency, openness, sharing, fairness and justice. From the perspective of commercial operation, the introduction of Internet thinking enables e-commerce to continuously optimize the business ecological environment and operating rules with customers as the center. As far as teaching is concerned, the Internet brings us not only computer networking, but also human knowledge networking, which provides multi-faceted, multi-angle, illustrated learning materials and a variety of problem-solving ideas for education and teaching.

The Internet can bring more abundant resources and a more interactive platform for teachers' teaching and students' learning. The brand-new instructional mode represented by flip classroom and massive open online course has also brought different experiences to teachers and students, effectively changing the state of students' passive education in the past. Internet+education is not the instrumentalization of Internet technology, not simply the application of Internet technology to classroom teaching, but the transformation of teaching through Internet thinking, the integration of technology and teaching process, and the improvement of learners' comprehensive scientific literacy. Through the combination of multimedia technology and simulation technology, a virtual environment integrating sight, hearing and touch is formed, which makes learning information richer and faster. More importantly, the Internet can effectively strengthen the communication between teachers and students and promote teaching and learning.

In the Internet environment, learners no longer passively acquire knowledge from the media platform, but complete the learning process through the interaction between learners and the media

platform, between learners and between learners and teachers. The teaching process has changed from the form of teacher-centered and passive acceptance by students to the form of personalized learning with students as the center, students taking the initiative to learn and teachers actively guiding. Students can have more independent learning space and time under this new instructional mode, and of course teachers need to have certain computer operation skills, so that more online teaching programs can be launched under the condition of excellent comprehensive ability. Knowledge acquisition in the Internet age is no longer limited to traditional classrooms. Online teaching combined with the Internet platform can improve college students' enthusiasm for learning physics, and at the same time, it can also enable students at different levels to study according to their own foundation.

### 3. The implementation of internet thinking in physics teaching

#### 3.1 Focus on innovation in instructional mode.

At present, university courses are generally faced with the situation that the class hours are compressed and the course content is not reduced. Therefore, how to improve the teaching efficiency within the limited class hours has become the primary problem for teachers. It is an inevitable development trend to turn over the classroom and combine traditional teaching. In the stage of college physics teaching, teachers should innovate the instructional mode. Under the environment of internet +, there are many instructional modes, which bring a lot of benefits to college physics teaching. In the course of teaching, teachers can reasonably apply all kinds of network software APP in the teaching process. As a university teacher, we should know something about the physical and mental development and personality characteristics of contemporary college students, and fully realize that the content of physics teaching, which is limited to textbooks, is rigorous but not vivid enough, so it is difficult for contemporary college students to raise interest in it, and it is urgent to deepen the reform in instructional methods and forms. By guiding students to use a resource platform that integrates excellent teaching courseware inside and outside the school, they can not be constrained by a single textbook and a single teacher. The basic structure of the intelligent teaching system based on Internet is shown in Figure 1.

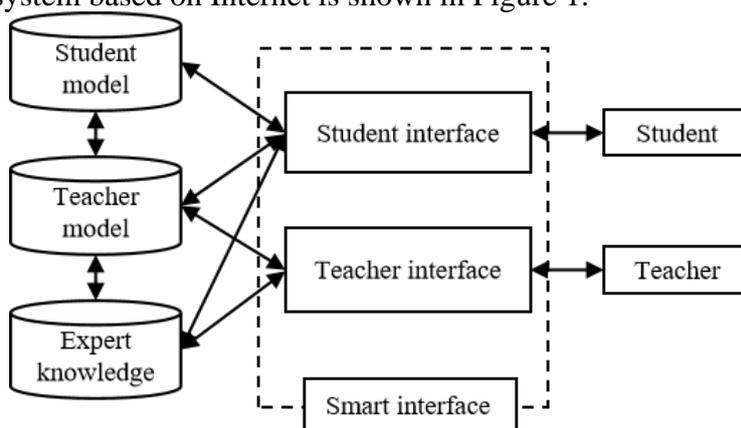


Figure 1 Basic structure of intelligent teaching system based on Internet

Because in the virtual environment, everyone's role is equal, and in an equal atmosphere, everyone has an equal right to speak, and the equal right to speak can promote students to respect themselves, release their true ideas and stimulate their potential. In today's "internet +" background, the Internet education mode has a great impact on the traditional instructional mode, which can better meet the needs of contemporary college students' autonomous learning in terms of teachers,

teaching facilities and learning time. This instructional method based on teaching resource platform and personal display platform can also provide students with a channel to show their understanding of physics knowledge, promote their potential and enhance their awareness of scientific research and innovation. Teachers should use online teaching resources to reasonably control students' learning progress and learning effect. Teachers construct a vivid physics teaching classroom for students through micro-video and animation resources. Students can carry out effective pre-class preparation based on their own learning needs. Teachers carry out face-to-face instructional mode between teachers and students, and incorporate some forms such as flip classes and group discussions. With the help of online teaching resources, students can broaden their knowledge horizons in group discussions and consolidate their learning in assignments and other aspects.

### 3.2 Carry out mixed instructional mode

Quite a few teachers are willing to try the practice of blended teaching, but they are skeptical about the effectiveness of this instructional model. The reason for this situation may be that in the mixed instructional mode, the roles of teachers and students have changed fundamentally, students need to explore relevant learning content through cooperation, and the proportion of autonomous learning has increased. In the virtual world of the Internet, all roles have equal right to speak, so students' real thoughts can be highlighted. For example, when teaching "The Theorem of Angular Momentum of Rigid Body Rotating on Fixed Axis" and "The Law of Conservation of Angular Momentum", the teacher can play the video of figure skating and diving competition for the students before class, and then let the students explore why the athletes can rotate quickly in an instant. At this time, when students' thirst for knowledge is stimulated, they will think of looking for answers through the Internet, and some students try to use theories and formulas to deduce by previewing in advance. The stage of teacher-student interaction and rational use of instructional methods in mixed instructional mode is shown in Figure 2.

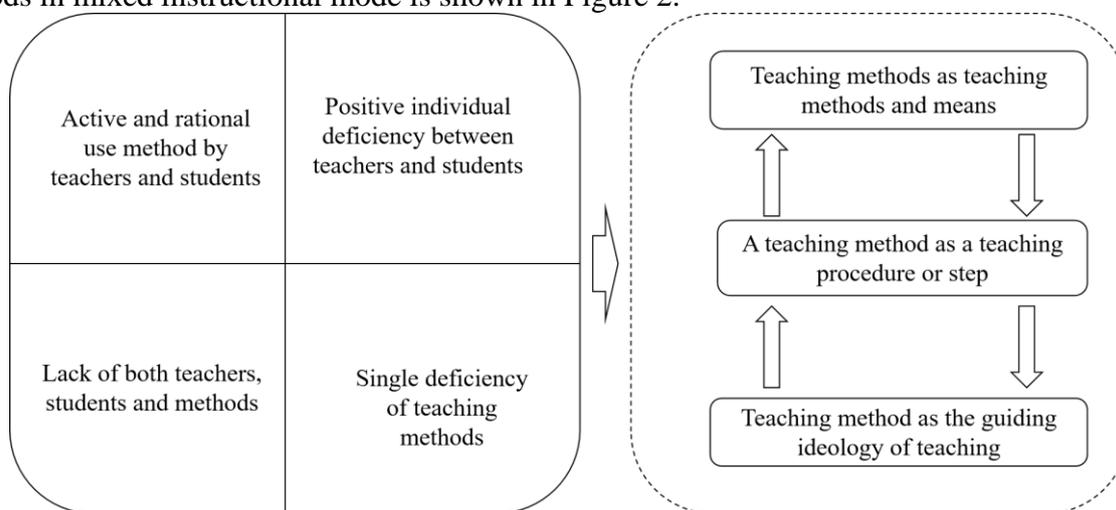


Figure 2 The stage of rational use of instructional methods

For offline discussion, it is need to follow the principle of step by step, guide students through autonomous learning and inquiry learning through enlightening questions, learn and master the key points and difficulties in teaching requirements, cultivate students' critical thinking ability and innovation ability, and finally realize their learning goals. Some students have sufficient theoretical knowledge, but lack practical ability, while some students have strong practical ability, but often their theoretical understanding is not deep enough. Students should make use of the formation of different characteristic groups to foster their strengths and avoid their weaknesses. At the same time,

they should explore physical problems in group competition and compare with each other to see if they can confirm theoretical deduction with practical data. For the design of learning community, teachers should group students based on the investigation of their learning ability, communication ability and knowledge background, so as to ensure that the learning community can realize effective interaction and improve learning efficiency. For the design of learning atmosphere, teachers should make full use of classroom feedback system, keep abreast of students' learning situation, and help students solve problems by adjusting teaching strategies.

#### 4. Conclusions

In the stage of college physics teaching, internet + model should be used reasonably. Under this teaching background, students will gain rich physical knowledge, which is the basis for improving their comprehensive ability. Faced with many challenges, both teachers and students need to correctly understand their role orientation and realize that "Internet+education" is an upgrade to the traditional instructional mode, not a complete replacement. Nowadays, the physics teaching reform in universities has organically combined traditional education, modern education, computer technology and the Internet, and also achieved the integration of theory and practice. In the future, the synergy of online and offline mixed instructional mode will become an inevitable trend in the growth of instructional mode. Therefore, it is imperative to make rational use of online resources and break through online and offline teaching barriers to explore teaching reform and innovation. Educators need to actively use Internet resources to reform and innovate teaching and learning methods, and find the best way to improve their scientific research and innovation ability and comprehensive literacy, so as to effectively promote the comprehensive reform of college physics education. According to the teaching content provided by teachers, students analyze the connotation of physics knowledge and form a targeted instructional model, so that internet + can really promote the development and progress of college physics teaching.

#### References

- [1] Zhang Guangye. *Physics classroom instructional mode under the background of new curriculum* [J]. *Qinghai Education*, 2018(11): 1.
- [2] Li Song, Liu Xiuqin. "Internet +" University Physics Experiment Teaching System Construction [J]. *Experimental Technology and Management*, 2017(01): 177-179.
- [3] Li Shuxia, Li Yan, Liu Xiaoyan. Research on college physics teaching under the background of "internet +" [J]. *Heilongjiang Science*, 2019, 10(9): 2.
- [4] Liu Hongli. Exploration and Research of Physics Experiment Teaching in internet + University [J]. *Science and Technology Information*, 2021, 19(8): 4.
- [5] Wang Xinrong. "Internet +" University Physics Experiment Teaching System Construction [J]. *Information Weekly*, 2020(9): 2.
- [6] Xu Jialu, Xu Lijun, Li Zhongqi, et al. Research on the cultivation of students' innovative ability in college physics teaching in the Internet age [J]. *Physics Bulletin*, 2022(11): 5.
- [7] Xu Ke. Research on the Application of Modern Internet Technology in College Physics Experiment Teaching [J]. *Journal of Jilin Education College*, 2018, 34(11): 4.
- [8] Udigwe I B, Okechukwu R, Ajator C, et al. Adolescents and Youth Friendly Health Center. Comprehensive and Primary Health Care Center. Nnamdi Azikiwe University Teaching Hospital Nnewi. Nigeria [J]. *Journal of Adolescent Health*, 2017, 60(2): 61-62.
- [9] Bai Xufeng. Exploring the construction of "internet +" university physics network teaching [J]. *China New Communication*, 2020, 22(19): 204-205.
- [10] Zheng Jungang, Yang Dafang, Liu Yue, et al. research on the instructional mode of college physics experiment based on "internet +" [J]. *College physics experiment*, 2020, 33(3): 3.