The Practice and Application of Computer Network in "Information Technology Foundation" Education

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Abstract. The computer network plays an important role in modern higher education in China. "Information technology foundation" course is an important professional basic course for "mathematics and statistics", "physics and electrical engineering", "information science and technology" such specialties. The mixed education mode is adopted in the course, combined with the network platform as auxiliary teaching tools, therefore, better teaching results have been achieved in practice. This paper expounds the content setting and mixed teaching system structure of the "information technology foundation" course, and gives the usage and statistical data results of the online teaching platform applied by some students in the three grades of 2016, 2017 and 2018. The research shows that the use of network platform is of great help to improve the teaching effect. At the same time, some problems of using network platform are pointed out.

1. Introduction

Computer network is indispensable in all walks of life and plays an important role in college education. With Internet technology, students can study and communicate online without time or space restrictions. At present, mobile network technology is convenient and fast, providing good conditions for college students to study. Network learning mode has become a popular learning mode in the basic course of computer science in university. With the emergence and promotion of educational informatization, mixed teaching, as a new teaching method, has broken the requirements of traditional teaching. Regarding the development trend of mixed learning, Wei Xuefeng et al [1] compared the 2017 and 2016 "new media alliance China higher education technology outlook" and proposed that more applications of mixed learning in the teaching process will become an important trend in university education in the next one to two years. "Information technology" course is now a specialty basic course for "mathematics and statistics ", "physics and electrical engineering", "information science and technology" such specialties (hereinafter referred to as the "mathematics-physics-information classes" letter) in a lot of Chinese colleges and universities, which is both unique and universal, and there are many students in learning the course. Mozelius P, Hettiarachchi E. et al [2-3] found that nowadays mixed learning has been applied more and more widely in colleges and universities. Compared with traditional teaching and online learning, mixed learning can give full play to students' initiative, enthusiasm and creativity. Therefore, it is most appropriate to use the network platform as an auxiliary teaching tool for this course. On the one hand, a large number of people have
benefited from it; on the other hand, online teaching and offline teaching can be combined to improve teaching efficiency. Therefore, for the teaching of basic computer courses, the use of mixed teaching mode with network teaching method will receive better teaching effect.

2. Composition module and curriculum architecture of "basic information technology" course

2.1. Composition module of the "information technology foundation course"
"Information technology" as specialty basic course for "mathematics-physics-information classes" mainly includes nine modules, which are information technology overview, computer system, operating system, algorithm and programming, database technology, computer network, software engineering, multimedia technology and common office software MS Office2010. The content of each module includes theoretical content and practical content. The theoretical content can be learned online or offline. But the practice content needs to carry on the actual operation under the computer room environment to study. In order to deepen their study of the course, students also need to complete the online test and the offline homework exercises. Through the study of this course, students will know the basic knowledge of information technology and have the basic operation skills of information technology.

2.2. Course architecture of "information technology foundation"
The teaching of "basic information technology" course adopts the mixed teaching mode. The system structure of the course is divided into four parts: online part, offline part, abstract control, comprehensive test and evaluation. (1) online part: including preview before classes, in-class consolidation, after-class reinforcement, online interaction, asynchronous self-study, synchronous communication, collaborative learning, network testing, etc. (2) offline part: including classroom learning, practical operation, teacher guidance, classroom learning, group discussion, classroom assessment, etc. (3) abstract control includes: teaching resources, teaching methods, teaching environment, learning methods, etc. (4) comprehensive test and evaluation. The first part mainly relies on the network environment, and the development of mixed teaching needs the support of certain places and network conditions [4]. The second part mainly relies on the physical environment and the non-virtual communication between people, and the third part is the abstract control part. The fourth part is the comprehensive test and evaluation of the course. The final test results are formed according to a certain proportion of various tests of the course. The evaluation of the course is mainly based on the actual situation at that time, and the objective evaluation of the course is formed by integrating various factors, so as to provide valuable references for the subsequent courses learning.

According to the above components, a "basic information technology" mixed teaching architecture is formed, and the architecture is shown in figure 1.

3. Application of network platform in the course of "information technology foundation"
The computer network platform is indispensable in the mixed teaching mode, and the computer network is an important environment for online learning. Building a more complete network background resources provides adequate learning help for the frontend users. Network terminals can be mobile or non-mobile. At present, mobile terminal is widely used among college students. According to different student groups and knowledge contents, Liu Yongliang et al [5] divided the mixed teaching mode into network expansion, network going first and network collaboration based on mobile Internet. These models play a very important role in mixed teaching.

(1) Construction and use of network platform: At present, there are many kinds of online teaching platforms in many universities in China, but they are mainly divided into three types. One is to buy a ready-made network platform, add their own course resources, and then use; The second is to complete the development by users themselves, that is established by users themselves from the network platform to course resources; The third way is to buy completely ready-made from the Internet platform to the course resources. The first of the three is more widely used. The second
overall cost may be lower, but the development cycle of the network platform and the construction time of resources will be longer. The third kind of overall cost will be higher, and there will be some deviation between the course resources and users' requirements with the course opening; In contrast, the first one has a better overall cost performance. Because the online course platform is relatively stable, the course resources are established by users themselves, which can be updated in time according to the needs of users. Therefore, most users use the first kind of network platform. The following is an example of the first use.

Fig.1 Mixed teaching architecture of "information technology foundation"

(2) Construction of network resources: Generally speaking, the constructors of network course resources are teachers. The teacher carries on the resource construction according to the teaching curriculum situation and the students' concrete situation. The course resources can be rich and varied, which can be divided into text type, audio type, video type, audio and video type, animation type and so on. From the point of view of use purposes can be divided into learning (or self-learning), reinforcement, monitoring, testing; From the perspective of knowledge structure, knowledge points can be divided into different knowledge units according to modules, and each unit can be divided into corresponding knowledge modules. Generally speaking, the construction of network resources is a project with strong comprehensiveness and rarely using a single mode of resource construction. Therefore, the above mixed modes are widely used at present.

(3) Use of network resources: The main body that use network resource is a student. Students can choose to study online according to their own learning situation. The ways of learning can vary from
person to person and vary greatly. Some students like multimedia teaching resources, using multimedia teaching environment and multimedia teaching equipment for online learning, mobilize a variety of sensory organs, to maximize the acquisition of knowledge. This requires teachers to optimize multimedia teaching resources in the construction of course resources, so that it does not have to be too complicated, but "refined", "excellent" and "diverse". Otherwise, the resources are too large, resulting in a large amount of network load, which will consume a lot of learning time and reduce learning efficiency.

4) The using ways of network resources: There are two ways of using network resources: mobile and non-mobile. Mobile learning method is a way currently favoured by college students, because it cannot be limited by time, space and place, with good flexibility and mobility, easy to carry. The disadvantage is that the display screen is small and the visual effect is limited. And using a network by the fixed desktop computer that is not mobile is that show screen is big enough, visual effect is good, but its carry is inconvenience, lack flexibilities. Therefore, each has advantages and disadvantages, whether using fixed terminal or mobile terminal for network course learning. No matter using what kind of resources can be harvested as long as the full use of network resources.

4. The practice of computer network in "information technology foundation"
Using computer network teaching platform to teach "information technology basis", and using mixed teaching mode, namely the traditional teaching mode and the current network teaching mode combined, are now a kind of educational form with The Times, but it is also one of the teaching methods with high teaching efficiency. The following is the comparison data of the comprehensive test results of the basic knowledge of "information technology foundation" course for 1,724 students of "mathematics-physics-information classes" in recent three years (2016, 2017 and 2018), shown in table 1. In the research process of the project, the research team collected information about the students of "digital and physical information" in 12 classes of 2016, 11 classes of 2017 and 12 classes of 2018. Among them, the number of students who used the online teaching platform was the number of students who signed up voluntarily. The comprehensive test is carried out by the paperless test system, and the test data is automatically obtained by the system without any manual intervention.

| Grade | Numbers tested | Teaching methods | Network platform usage (%) | Average score | Numbers rate with high score(≥90)(%) | Numbers rate with low score(≤30)(%) | Pass rate (%) | Excellent rate (%) |
|-------|----------------|-----------------|---------------------------|---------------|--------------------------------------|-------------------------------------|---------------|-------------------|
| 2016  | 604            | mixed           | 22                        | 61.38         | 3.1                                  | 4                                   | 60.96         | 2.32              |
| 2017  | 535            | mixed           | 61                        | 66.04         | 4.3                                  | 1                                   | 70.28         | 7.66              |
| 2018  | 585            | mixed           | 93                        | 71.33         | 1.2                                  | 0                                   | 80.68         | 11.28             |

According to the statistical analysis of the data in table 1, the utilization rate of “mathematics-physics-information classes” students in 2016, 2017 and 2018 on network platform shows a trend of increasing year by year in the past three years. In terms of the average score, pass rate and excellence rate of the comprehensive test, the 2016 grade is the lowest, the 2017 grade is the highest, and the 2018 grade is the highest. It can be seen from the highest and lowest points in the statistical figure that the grade 2017 has the highest percentage of numbers with the highest scores, followed by 2016 grade, the lowest for 2018 grade. However, from the point of numbers rate with low score, the highest is in 2016 grade, followed by 2017 grade and lowest for 2018 grade, which shows that after using the network teaching platform, the overall level of student achievement has improved and the gap between high and low scores has narrowed. The specific data statistics are shown in from Fig.2 to Fig.6.
5. Discussion on the use of network teaching platform

Computer network teaching platform has been more and more widely used. It can be seen from the statistical results of the above data that the mainstream of network teaching platform is good, because
it cannot be limited to learn and communicate by time and space. The benefit it brings the teachers and students is quite big, the teaching effect is quite obvious. The scattered time can be fully used to carry on the independent study, therefore, it has saved the quite big time to use in the practice operation, and it is helpful for the practice ability enhancement. It can improve students' interest in study. But everything has its two sides, although the computer network teaching platform has obvious advantages, but the use of network teaching platform must face and solve some practical problems to receive greater benefits. (1) The network platform depends on the performance of the service of the architecture platform. For large-scale online use, sometimes the network environment is congested. Therefore, it needs to be improved in time alone with the continuous update of network course resources. (2) When using the online teaching platform, the individuals without self-control are often susceptible to the influence of other online factors, thus unable to continue their learning. Therefore, the use of online teaching platforms requires students to have a certain degree of self-discipline. (3) In order to achieve the maximum effect, it is necessary to have the support of mobile network environment. (4) The design and production of online teaching resources requires teachers to invest more time and energy. Therefore, designing and producing network teaching resources has higher requirements for teachers.

6. Conclusion
In China, computer network teaching platform technology has developed rapidly in recent years, and many colleges and universities are building and promoting network courses every year. After setting up a good network environment and making relatively complete course resources, the use of network teaching platform combined with mixed teaching mode will receive good teaching effects, and comprehensively improve students' knowledge acquisition and practical ability. But on the other hand, the use of computer network teaching platform on the network environment is a certain requirement, but also requires teachers to have a more comprehensive ability and students to have a certain degree of self-discipline.

Acknowledgments
This work was financially supported by 2017 Hainan higher education and teaching reform research project (hnjg2017-32); Supported by the first batch of university-level excellent online courses in Hainan Normal University - information technology foundation; The third batch of high-quality online open courses of colleges and universities in Hainan province - information technology foundation.

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