Application of Flipped Classroom Teaching Model based on Online Open Shared Course Platform

--Take the "Python Language Programming" Course as an Example

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Abstract

To provide new ideas for exploring the teaching reform of professional courses, take the "Python language programming" course as an example, use the Zhejiang online open course sharing platform to design the flipped classroom teaching mode, select teaching experiment objects, and implement the "online + offline" hybrid Teaching practice, and finally verified the effect and satisfaction of flipped classroom teaching through student questionnaires and seminars. Practice has proved that the flipped classroom teaching model plays a positive role in cultivating students' independent learning ability, stimulating students' interest in learning, enhancing classroom participation and students' sense of teamwork.

Keywords

Flipped Classroom; Online Open Course Sharing Platform; Python Language Programming; Teaching Mode.

1. Introduction

In March 2012, the Ministry of Education issued the "Ten-Year Development Plan for Educational Informatization" and pointed out that the development of educational informatization should be guided by the innovation of educational concepts, based on the construction of high-quality educational resources and informatized learning environment, and based on learning methods and education. Model innovation is the core [1]. The "Flipped Classroom", which was rated as a major technological change affecting classroom teaching in 2011 by the Canadian "Globe and Mail", once provided the forerunner of the innovation of education concepts in my country [2], led the classroom teaching revolution, and played an important role in the process of education informatization in my country. To the great promotion effect. Flipped classroom is a means of informatization teaching reform and a hybrid teaching mode that combines online and offline. In the past ten years when the flipped classroom teaching model has flourished, domestic schools at all levels have introduced and combined with their respective schools' conditions to carry out localized flipped classroom teaching practice [3]. This article combines the teaching concept of the basic course of big data technology major, with the help of the online open course sharing platform in Zhejiang Province, carries out the teaching design and practice of the "Python language programming" course, verifies the effect of the flipped classroom teaching model, and hopes to promote other majors. Curriculum teaching reform provides new ideas.

2. "Python Language Programming" Explores the Necessity of Flipped Classroom Teaching Reform

"Python language programming" is the first programming language course for computer college students. It provides the necessary basic knowledge and programming methods for other programming courses. It is related to big data technology, software technology, computer network

technology, information security application technology, etc. Professional professional basic courses embody basic programming skills. It is hoped that through the "online + offline" hybrid teaching, students' interest in learning programming languages can be really stimulated. Therefore, the teaching objectives of the "Python language programming" course are in line with the main concept and practical characteristics of the flipped classroom, and it is very necessary to carry out the reform of flipped classroom teaching.

2.1 Requirements for Development in the Information Age Section Headings

With the development of information technology and the renewal of modern educational methods, great changes have taken place in the reform of education and teaching. Flipped classroom, as a new trend in the current higher education teaching reform, has successfully realized the innovation of the traditional teaching mode to a certain extent [5], made up for the shortcomings of traditional classroom teaching, and improved the learning of MOOC or SPOC combined with it. The quality has improved the students' autonomous learning ability and stimulated their enthusiasm for learning. "Python language programming" as a basic programming course for computer-related majors in higher vocational colleges is particularly important. It is also an urgent need to keep up with the development needs of the times, do a good job in curriculum teaching reform, and improve teaching effects.

2.2 The Demand for New Curriculum Reform Ideas

From the perspective of curriculum reform, the flipped classroom is of reference significance for the curriculum reform that is being implemented in the education sector in an all-round way. The curriculum reform has been more than ten years, but there have been no particularly big changes and very significant results. The enlightenment of the flipped classroom for the current curriculum reform is that it can promote the active participation of teachers and students, and seek a bottom-up, integrated "curriculum reform" road. The teaching process is a process of teacher-student, student-student interaction. Classroom is not a place for pure knowledge instillation, but a place where teachers and students interact, learn together, tap students' potential, and let students realize their self-worth and find happiness. Combining the curriculum teaching concepts of "problem-driven", "basic first" and "combination of examples and practice" to promote the "Python language programming" flipped classroom teaching reform is very necessary and in line with the new curriculum reform concept.

2.3 "Python Language Programming" Needs of its Own Characteristics

In the information age, it is advocated to put "knowledge" in problems and in reality, so that students can actively explore, discover, experience and solve problems by collecting information, analyzing information, processing information and using information, so as to cultivate and acquire new knowledge. And the ability to use knowledge to innovate. In order to improve students' skills and change the previous teaching situation, the big data technology teaching and research section of our school has conducted years of teaching mode research and exploration of training programs, according to the teaching ideas of "employment-oriented, ability-based" and "project teaching method" , And formulate the corresponding project teaching plan. The classroom teaching reform of this course is to be implemented on the basis of the above teaching ideas, to change the original traditional teaching mode, and to reform the traditional experimental and practical teaching mode with the "project case" as the driving force. Leading students to simulate project practice is easy for students to accept, and can apply the knowledge and software they have learned well, and ultimately enable students to truly master the software development process. Through the flipped classroom teaching, the above teaching concepts can be combined, the classroom initiative can be returned to the students, and the teaching effect can be improved.

3. Design and Implementation of Flipped Classroom Teaching Based on Online Open Shared Course Platform

3.1 Course Status Analysis

The teaching of traditional development courses only teaches the operating methods of software development tools. After the theoretical knowledge points are taught, students conduct software tool operation experiments and complete after-class exercises. The knowledge points are scattered until the last semester. Students can only write simple development languages and the basic use of development software, and cannot flexibly integrate various knowledge points for software development practice, and cannot truly apply the knowledge they have learned to the actual development process.

This course aims to enable students to master the basic knowledge and skills of Python language development through task-led project activities. Finally, through the training of the simulation project, the students will have an overall understanding of secondary development and big data related software development in cognition and practical operation, and master the basic technology and application skills of the Python development language. Advocate students to "learn by doing" to lay a good foundation for improving students' professional ability.

At present, "Python Language Programming" has accumulated complete teaching content, course standards, teaching design, teaching courseware, and complete online teaching videos, homework, tests, exam question banks and other resources. In recent years, a variety of teaching reform practices have been tried, from the original teaching material system to the special teaching that integrates the teaching materials, and the pure classroom teaching has gradually changed to a teaching method with classroom teaching as the main and practical teaching as a supplement. Due to the rise of online teaching, I began to try to combine classroom teaching with online courses; from a single teacher classroom teaching to a teaching method that mainly focuses on teachers in the first classroom, and focuses on student discussions in the second classroom. All of these provide a good opportunity and a solid foundation for the teaching and research of the "Python language programming" flipped classroom[6].

3.2 The Overall Experiment Design of the Course

Curriculum teaching has selected 2018 students for traditional offline teaching, and 2019 students of the same major will conduct flipped classroom teaching on the online open curriculum sharing platform of Zhejiang Province. Through the design of experimental hypotheses, variable control, teaching content and schemes, follow the quasi-experiment Research method and previous flipped classroom teaching design. Carry out flipped classroom teaching experiment design, upload the designed and developed course resources to the Zhejiang online open course sharing platform, and carry out flipped classroom teaching practice based on the teaching experiment design. Finally, after 13 weeks of theoretical and practical teaching in the same major in two grades, experimental data was collected to verify the effectiveness of the "Python language programming" flipped classroom teaching model. The experimental hypothesis, variable control, and the overall experimental structure are shown in Figure 1 and Figure 2 [4].

3.3 Flipped Classroom Teaching Design and Implementation

According to the flipped classroom teaching concept, supported by the Zhejiang Open Online Course Sharing Platform, it is divided into three links: pre-class resource design and task assignment, implementation of class activities, and after-class feedback and evaluation. Teachers and students participate in all three links, and the three links have a cyclical influence on each other, as shown in Figure 3.

3.3.1 Pre-class Resource Design and Task Assignment

Based on years of curriculum reform experience accumulated by teachers in the teaching and research section and curriculum resource construction, in order to better carry out flipped classroom teaching, the total class hours of the course are 48 hours. By incorporating classic project cases, it is conducive

to students' understanding and learning. The concept of this course requires students to fully mobilize students' thinking and hands-on ability, learn first and then teach, intensive lectures and more practice. Therefore, students' experimental classes account for more than 2/3 of the total class hours, enabling students to "learn by doing" and the courses are all in computer The room is complete.

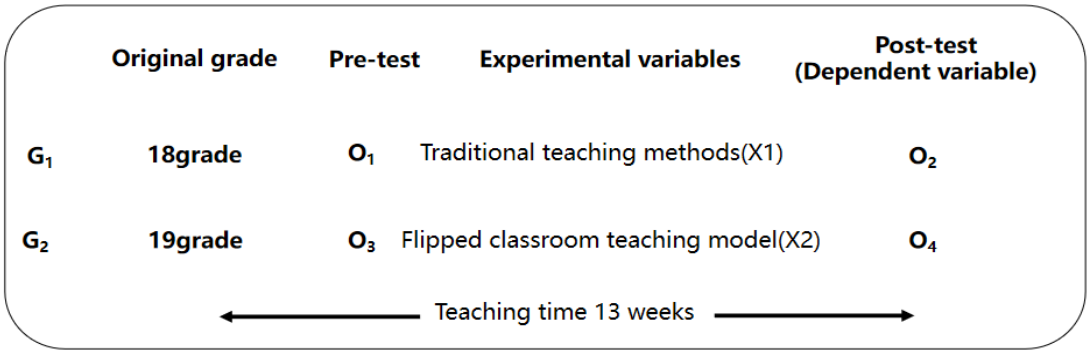


Figure 1. Course pre-test-post-test, non-equivalent control group design

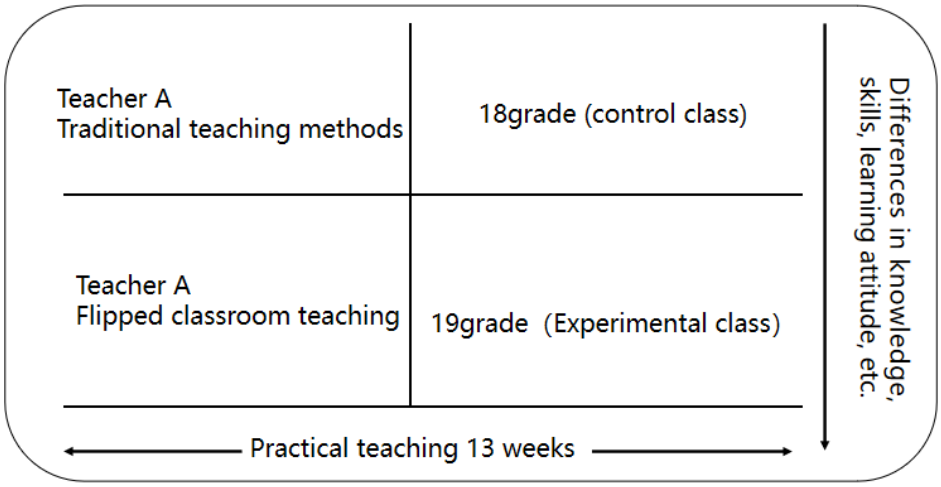


Figure 2. The overall experimental structure of the course

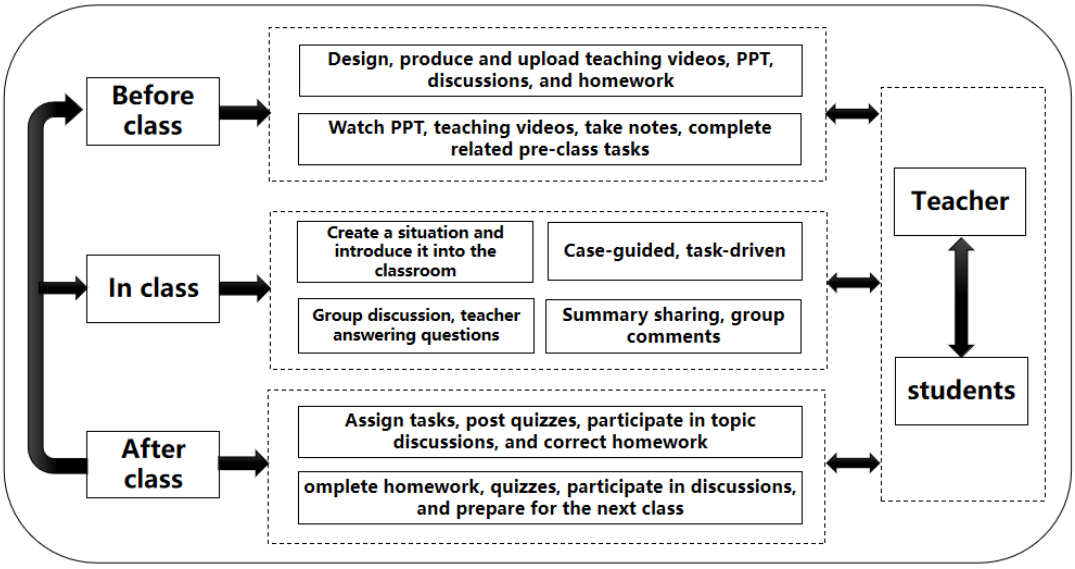


Figure 3. Teaching Design for Three Links of the Course

Focusing on the design of course knowledge points, teachers design and develop good teaching resources in advance, including course micro-videos, extracurricular extension videos, question banks, homework, discussion topics, etc. for release. Group the students and publish them in the announcement area of the Zhejiang Online Open Sharing Platform according to the teaching progress, reminding students to log in to the platform in time for tasks such as video learning, PPT reading, participating in topic discussions, and even group material collection[7].

3.3.2 Implementation of Classroom Activities

Make full use of the limited classroom time. According to the prior grouping, students conduct cooperative explorations, and teachers conduct key questions and answers, so that teachers can make full use of the limited 2 class hours to explain chapters and difficulties in-depth in class, and promote students' knowledge. Transformation and absorption[8]. The implementation of flipped classroom teaching enables the originally one-way teacher to teach the knowledge points to the students, and become the interaction, discussion, collaboration, sharing, and exploration between teachers and students, students and students, returning the classroom to students, allowing students to actively participate, teachers As a coach as a guide, this kind of knowledge absorption and internalization process is more in line with the constructivist learning theory and can really improve the teaching effect.

3.3.3 Feedback and Evaluation after Class

In the after-class phase, teachers evaluate in the group work area on the platform, check the student's video learning progress, and promptly urge students who have not completed the task to watch; in the discussion area module, the teacher comments and responds to the students' opinions in a timely manner , To guide other students to learn. Students can comment on the work of other groups on the platform, and test the learning situation and teaching effect through teacher-student evaluation and internal evaluation of students and students, and mutual evaluation between students can increase the fairness of evaluation to a certain extent. In addition, teachers can use the platform to initiate questionnaires to keep abreast of students' knowledge and satisfaction with the courses.

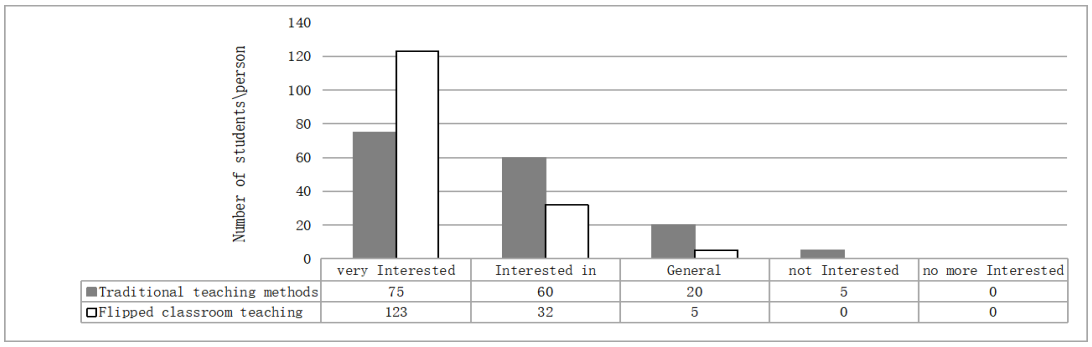
4. Analysis of the Effect of Flipped Classroom Teaching Based on the Online Open Course Sharing Platform

First of all, after the two grades passed a round of teaching practice, they designed relevant questionnaires respectively. Through the questionnaire survey method, the two grades were compared and analyzed in terms of learning interest, learning skills, classroom participation, and awareness of cooperation, and the corresponding results were obtained. in conclusion. Secondly, through the experimental grades, the satisfaction of the flipped classroom teaching method was investigated, and the students in each class were randomly selected to conduct concentrated discussions to understand the students' views and satisfaction with the flipped classroom. Finally, combine the conclusions of the first two to analyze the application effect of flipped classroom in "Python language programming", and summarize the experience.

4.1 Survey results for two grades

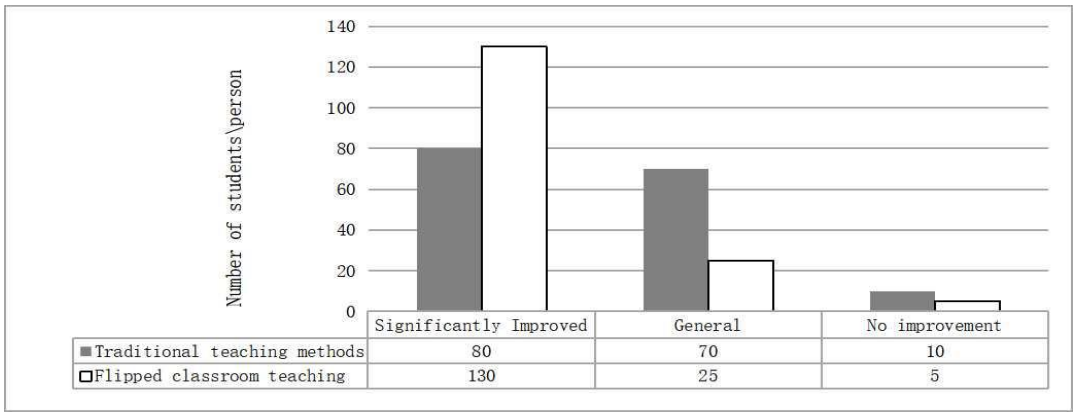
After the students studied the "Python Language Programming" course for one semester, a questionnaire was designed around their learning interest, self-learning ability, classroom participation, cooperative awareness and other dimensions. The 2018 and 2019 grade were surveyed, with a total of 175 people Participation, the platform eventually recovered 175 questionnaires, and after screening, an average of 160 valid questionnaires were retained for each grade. The comparative analysis results are shown in Figure 4 to Figure 8.

Through the comparative analysis of the above questionnaire results, after applying the online platform for flipped classroom teaching, students' interest in learning, autonomous learning ability, classroom participation, and awareness of cooperation have been significantly improved. Comparing the two grades, the final grades of 2019 students who implemented flipped classroom teaching were significantly higher.



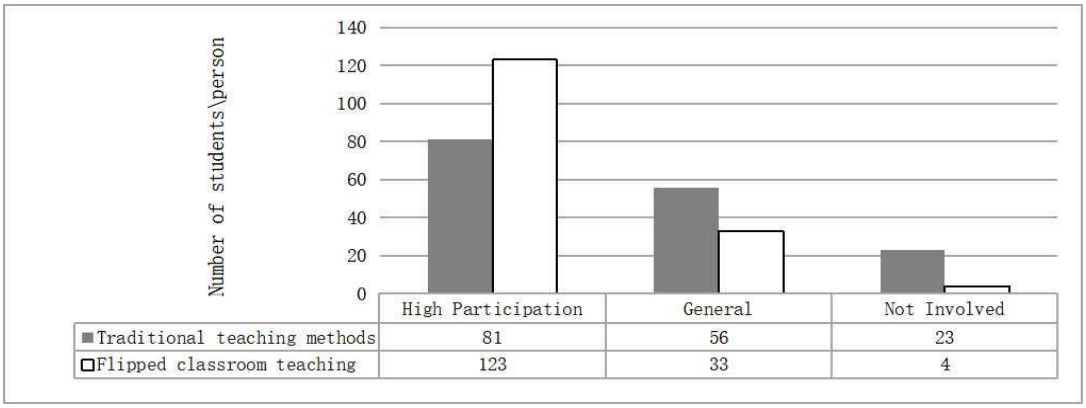
	very Interested	Interested in	General	not Interested	no more Interested
Traditional teaching methods	75	60	20	5	0
Flipped classroom teaching	123	32	5	0	0

Figure 4. Comparison of learning interest before and after application



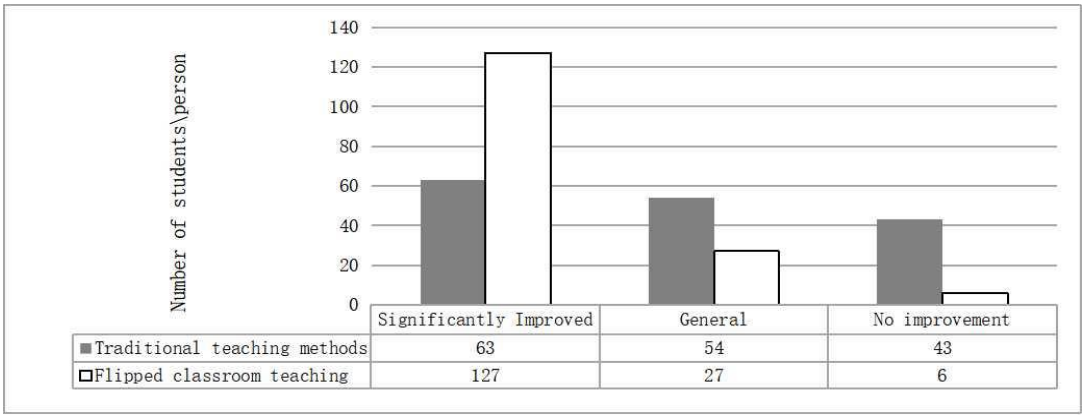
	Significantly Improved	General	No improvement
Traditional teaching methods	80	70	10
Flipped classroom teaching	130	25	5

Figure 5. Comparison of self-learning ability before and after application



	High Participation	General	Not Involved
Traditional teaching methods	81	56	23
Flipped classroom teaching	123	33	4

Figure 6. Before and after application of classroom participation



	Significantly Improved	General	No improvement
Traditional teaching methods	63	54	43
Flipped classroom teaching	127	27	6

Figure 7. Comparison before and after application of cooperative awareness

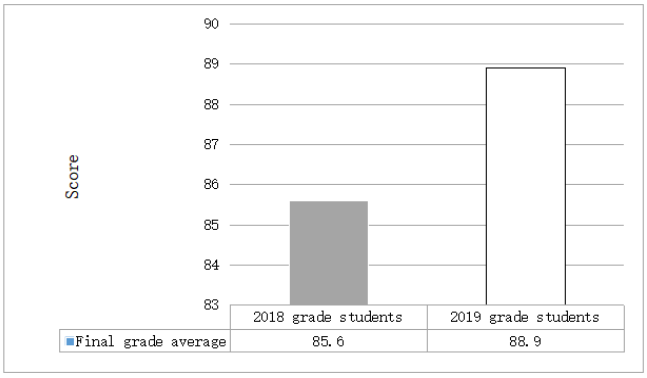


Figure 8. Contrast before and after the application of the final grade average

4.2 Flipped classroom teaching satisfaction survey

After the 2019 students have conducted flipped classroom teaching, in order to better understand their views and satisfaction with flipped classroom teaching, after a round of teaching practice, 50 students were randomly selected from 2 administrative classes for final course satisfaction Discussion and questionnaire, the results of the questionnaire are shown in Table 1 below.

Table 1. Teaching satisfaction survey questionnaire results

Problem Description	Options	Number of samples	Percentage/%
Through one semester of online platform learning and classroom interactive Q&A, do you like this teaching method?	be fond of	42	84.00
	general	5	10.00
	dislike	3	6.00
Compared with traditional classroom teaching, do you think flipped classroom teaching is helpful to cultivate your independent learning ability and teamwork ability?	Very advantageous	26	52.00
	More favorable	17	34.00
	do not know	5	10.00
	unfavorable	2	4.00
If other professional courses also use flipped classroom teaching, do you accept it?	pleasure	35	70.00
	general	13	26.00
	unwilling	2	4.00

The above questionnaire questions were also discussed at the scene. Some students put forward a few suggestions: First, the video on the platform should be controlled at about 5-10min. Some videos are too long, more than 15min, and they are easy to get tired. It's not easy to absorb. Second, in addition to the instructional video, the tasks discussed in class can be more clarified, so that it is easier to focus on the most difficult points. The third is to hope that the teachers will be more reasonable in group allocation, can fully mobilize the enthusiasm of all group members, give them more opportunities to show themselves and increase their sense of participation. Combined with the comprehensive analysis of the questionnaire and interview results, the following conclusions can be drawn.

(1) More than 80% of students hold a positive attitude towards the flipped classroom teaching model based on the online open course platform, and still like this teaching method very much, which is very different from the traditional teaching methods of other courses. Of course, there are very few students who say that this teaching method takes time.

(2) The results of the previous student questionnaire are similar. More than 80% of the students believe that this teaching model has a positive effect on mobilizing their own learning initiative and enhancing the communication between teachers and students, and at the same time, it is conducive to improving their ability to analyze and solve problems. Conducive to strengthening teamwork and enhancing teamwork awareness. However, a small number of students pointed out on the spot that individual students were not very active in the process of teamwork to complete tasks. They liked to "ride the train", which would have a bad influence on the entire group of students.

(3) More than 70% of the students still agree that other professional courses also adopt this teaching method. You can use the boring theoretical content to learn in fragments outside the class. The class focuses on questions and discussions, and there are more online question banks, which will help everyone in the final exam. The pass rate. However, some students still hold a reservation. They feel that the flipped classroom format takes up time after class and requires higher self-learning ability and self-discipline, which is a challenge for them.

5. Conclusion

It must be noted that although the flipped classroom teaching model has many advantages [9], there are still shortcomings in the implementation process. For example, in the pre-class learning tasks, although most students are actively participating, there are still a small number of students who are afraid of difficulties. Emotions and time are not well arranged, so the learning effect is not good; in the Q&A and group discussion in the class, there are also individual students who did not participate in it and failed to achieve full interaction and communication.

"Python Language Programming" uses the online open sharing platform of Zhejiang Province to carry out flipped classroom teaching design and teaching practice, which has a positive effect on cultivating students' independent learning ability, learning interest, classroom participation and teamwork awareness, etc., and truly stimulates It also boosted the enthusiasm of the students and also activated the professional classrooms.

Acknowledgements

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