

# Research on the Effect and Teaching Mode of Three-Dimensional Teaching Resources Construction—The Experience of the Curriculum Reform of “Multimedia Technology and Application”

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**Abstract.** With the popularization of computer application, the freshmen’s computer level is no longer a “zero starting point”. The traditional teacher-centered teaching mode can no longer meet the learning needs of students at different levels and the teaching effect is not satisfactory. This paper introduces the mode research and the teaching effect that we have obtained. They are based on the teaching reform of “Multimedia Technology and Application” course of Zhuhai College of Jilin University as an example, use existing teaching resources for scientific integration, combine modern technology to develop the teaching of three-dimensional resources, and make full use of these into various teaching links.

## Introduction

As computer technology continues to infiltrate our lives, primary and secondary schools have begun to popularize computer application education. As a result, the teaching methods of the traditional college computer foundation courses are no longer suitable for the learning needs of modern college students. Some students with better foundation are dissatisfied with the traditional teaching mode. Therefore, in accordance with the characteristics of running an independent college and the features of students, our college applied for the “Project of Computer Public Curriculum Reform in Higher Education Institutions in Guangdong Province”, which is conducted by the Teaching Steering Committee of Computer Courses of Guangdong Province University. In this context, our school launched a year-long teaching reform. During the reform period, we have achieved good teaching effect through the use of modern technical means and multimedia three-dimensional teaching resources. This article discusses the implementation process and effect of education reform and the reform mode.

## The Implementation Process and Experimental Results of Curriculum Reform

The concept of three dimensional teaching resources is that it takes modern information technology as means, takes long-distance transmission of digital education and teaching software as teaching materials, takes Internet as learning and management environment, and takes autonomous, open and interactive learning as the main learning mode. It is based on media material, and applies to multi-level teaching objects. It covers all aspects of teaching process so as to build a teaching resource system [1]. According to the present situation of computer public basic teaching in our university, we combine the idea of three-dimensional teaching resources to change the overall reform program from the original teacher-led to the teaching mode of “guiding learning + counseling + autonomous learning + passing examinations”. Throughout the implementation of the reform, we used three-dimensional teaching resources to carry out teaching and research activities. The overall implementation and effectiveness are as follows:

**Setting up a Reform Team.** We set up a university computer foundation curriculum reform team. The reform group includes Academic Affairs Department, Department of Computer Science and Technology, and the students’ college. Academic Affairs Department is responsible for the relevant

policies and supports material development. Teachers of computer department are responsible for the formulation of teaching reform implementation plan, teaching plan and syllabus, and the concrete implementation of the reform plan. Each teacher is responsible for the construction of three-dimensional teaching resources in each chapter in his / her spare time. The students' college is responsible for the concrete implementation of the reform.

**Reforming the Teaching Mode.** The teaching task of this course has been changed from 52 hours (including 32 hours of lectures and 24 hours of on-machine training) to 48 hours (including 16 hours of instruction and 32 hours of on-machine training), which has increased the proportion of on-machine training. The teaching task book is issued by Academic Affairs Department. Teaching mode takes the on-machine training as a major part, and the guidance learning is supplemented. We have arranged learning guidance for eight times. The main topics covered in this course include: learning methods of this course reform, basic knowledge of multimedia technology (2 hours), data compression (2 hours), the application of the image processing software (4 hours), the application of the animation software (4 hours), application of audio processing software (2 hours), and the application of video processing software (2 hours). The contents of the learning guidance and the matching of teachers are shown in Table 1. The purpose of teaching is mainly to let students know the level of knowledge that needs to be met in every aspect.

**Table 1** The table of the content of eight times' learning guidance and teacher ratio

Times	The content of learning guidance	The number of teachers
The first time	multimedia technology fundamentals	2
The second time	data compression	2
The third and fourth times	application of image processing software	4
The fifth and sixth times	application of animation software	4
The seventh time	application of audio processing software	2
The eight time	application of video processing software	2

The rest of class hours are all for on-machine operation. In the spare time, we open part of the machine rooms all day long, and let students freely choose the machine's using time. In the early education reform, we first adopted the existing teaching resources of third-party certification platform, used multimedia teaching equipment, online classroom resources and the online teaching platform developed by our school. Students can choose their own learning content. The enthusiasm of students to gain knowledge is generally enhanced. This enhances the richness of the classroom content and the flexibility of the students' learning. In the process of interaction with the network platform system, students can learn their own knowledge and test themselves at any time. Teachers can also master the situation of students' completion and the mastery of knowledge points through the network platform. According to the goals and teaching content of the computer-based teaching of non-computer major offered by the Ministry of Education, the teaching of undergraduate computer science can be roughly divided into two levels: one is computer-based teaching at the basic public university level, the other is computer teaching which is related to specialized courses (Combined with professional courses) [2]. With the accumulation of reform experience, our school

combines the characteristics of the independent college students, and constantly develops the three-dimensional teaching resources in accordance with the characteristics of the students.

**Organizing Teachers to Develop Three-Dimensional Teaching Resources.** The department held a regular seminar on curriculum reform for teachers to realize the necessity of curriculum reform. In addition to classroom teaching, teachers' tasks also include: making courseware, maintaining online learning platforms, testing system tests, establishing plans for participation in resource development, and improving curriculum resources. Teachers not only teach, but also participate in the development of three-dimensional teaching resources. The active participation of teachers not only enhances the teacher's enthusiasm for teaching, but also improves the teachers' teaching level and knowledge level. Specific resources are built according to professional characteristics in which includes supporting materials, video online courses, teaching electronic courseware and experimental process video, the final results will be uploaded to the students' network teaching platform, so as to realize resource sharing. Students can access resource directly through the network. Teachers' reference books, study guides, laboratory guides, exercise books, courseware and other paper materials will be replenished at any time. Prepared paper textbooks, which highlight the key point and keep pace with the times, have now been put into teaching. At the same time, its supporting electronic teaching resources are constantly being supplemented. The main division of labor is shown in Table 2. The diversification of curriculum resources is the main characteristic of stereoscopic teaching. Diversified curriculum resources create a three-dimensional learning atmosphere. Textbooks are no longer the only curriculum resources. Students not only have a more comprehensive and abstract paper textbooks, but also have e-lesson plans, CAI courseware, case libraries, streaming media and other information media materials. Courses and web-based learning platform based on multimedia and network technology have greatly expanded the space and latitude of curriculum resources. [3]

**Selecting Some Majors as Teaching Reform Pilots.** Our pilots include several major programs and it mainly includes: Department of Chinese, Department of Foreign Languages, and Department of Music. They took the lead in carrying out the teaching reform of multimedia technology and applied courses, and establishing a teaching mode that combines with autonomous learning, collaborative learning, classroom teaching and experimental training. We set up the teaching content for the students of different majors, and compare the students' characteristics through the results of the first term teaching reform to sum up the experience. In the second semester, we continued the teaching reform in the remaining specialties. Based on the successful teaching experience in the last semester, based on the existing teaching resources, we have gradually developed three-dimensional practical teaching resources which are professional-oriented and rich. These teaching resources include teaching materials, courseware, internet teaching resources and rich teaching content. [4]

Table 2 The table of division of labor for teachers to develop three-dimensional teaching resources

Major	Distribution of teacher's three-dimensional resources development (person)			
	Lecture video	Reversion of paper material	Electronic courseware production	Media Information Resources
Develop according to professional characteristics Department of Foreign Languages	1	All	4	4
Department of Chinese	1	All	4	4
Department of Music	1	All	4	4

**Using the Third Party Certification Test.** For many years, computer teaching has always had a tendency to pay attention to skills and to despise ability. The examination content does not take into account the students' characteristics and professional characteristics. The training goal of computer education highlights the specialty orientation, the skills and knowledge highlights the comprehensiveness, and the formation of ability quality highlights practical application. The examination content is biased on the assessment of the theory and skills, and does not reflect the students' ability to solve practical problems [5].

In the form of the traditional "written test + on- machine test", the form of the examination is transformed into "third party certification test + professional application and comprehensive operation". The third party authentication adopts the third party certification platform examination system, realizes the separation of teaching and testing, and obtains 106 points of knowledge from the online teaching platform. The students' learning enthusiasm, manipulative ability, and the study initiative comprehensive quality are all improved. The form and proportion of the examination are as shown in Figure 1.

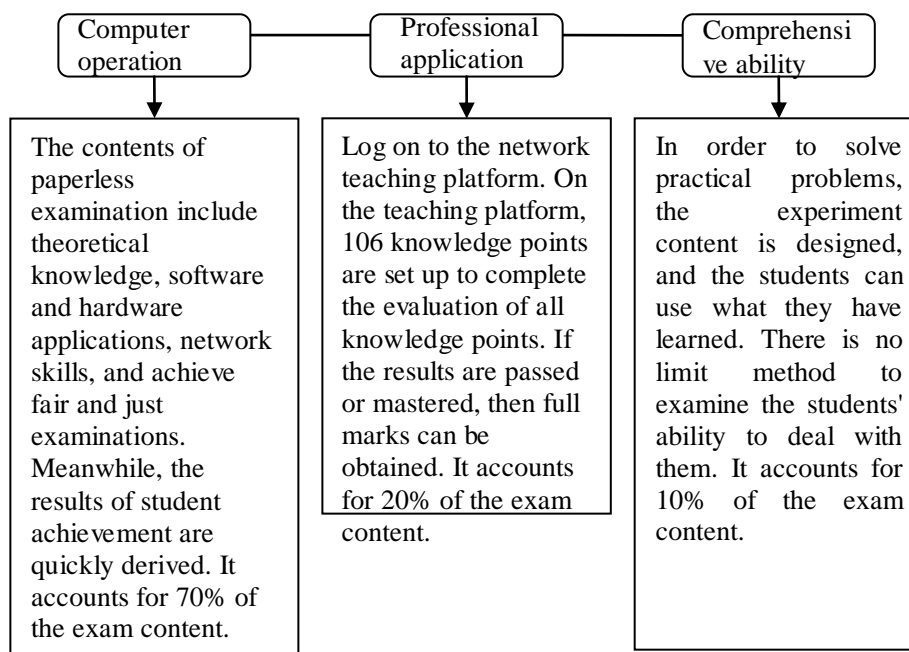


Figure 1. The form and proportion of the examination

In this way, students' learning enthusiasm and learning interest are obviously improved. At the end of the two semesters, the students' evaluation of the course and teachers was above 85 points, which was higher than the average of other unreformed public courses. It also reflects some problems. For example, classroom time is relatively less. Most students think that teaching speed is too fast. Some knowledge has not yet been digested and understood, and it has been referred to the next knowledge point. In order to solve this problem, we share all the videos of the teacher's classroom teaching to the network teaching platform, and the students can watch it again and again.

All the exams are all machine tests. The main contents include: basic computer concepts, operating systems, word processing, forms processing, presentation, and network operations. In the end, the passing rate of the first and second exams was all above 64%. Among them, the passing rate of the first teaching reform is as follows: the Department of Chinese is 60%, the Department of foreign language is 61%, and the Department of Music is 50%. This shows the gap between the students of different majors. We should adjust the knowledge structure to different major features. This achievement is basically consistent with that of key universities in the same period of reform, and shows that our computer basic course teaching reform has achieved preliminary results.

## **The Research on Teaching Reform Mode**

The university's multimedia technology and application teaching reform practice abandoned the traditional teaching methods, made full use of network resources and three-dimensional teaching resources, and achieved some success. Through this year's reform, we have summarized some experiences for reference:

**The Support of the College and the Construction of the Hardware Environment are the Backing of the Reform.** The curriculum reform of multimedia technology and application is strongly supported by the leaders and all relevant departments. The network lab is set up to provide a good environment for teaching, so that the teaching reform can be carried out smoothly. The core connotation of the construction of three-dimensional teaching resources is not only the stereoscopic form of resources, but also the stereoscopic service of resources, and good environment is also a guarantee for the successful implementation of this teaching mode. [6]First is the time. Three-dimensional resources will be applied to the whole period of students' study, and the laboratory is open all day. Next is the stereoscopic form. Through the network teaching platform, teachers and students can provide various teaching resources application services, such as network submission operation, teacher online judgment and so on. Finally, service objects are stereoscopic. Educational administration offices, libraries, teaching units and teachers can get rich content teaching resources [7] through different ways.

**Improving the Ability of Teachers and Students to Use Three-Dimensional Teaching Resources.** We should learn to summarize, continue to accumulate experience, and draw lessons from the useful methods and valuable experience of other institutional reforms. The reform of university's multimedia technology and application course was carried out under the premise of the approval of the computer teaching reform project in colleges and universities in Guangdong Province. As a result, many shared resources were obtained, including the reform experience and teaching cases of different colleges and universities, and the third party certification test system. Based on the use of available resources, we try to improve the information literacy of teachers and students at the same time. We try to improve students' ability to acquire information, skillfully use information, effectively extract information and autonomously learn. We also try to improve teachers' ability to use multimedia forms to express, to make and develop electronic lesson plans, and to use network education resources [8].

**Changing the Teaching Mode.** In the early period of teaching reform, due to the change of teaching forms, some teachers did not adapt to the new teaching method from teacher-led class to students' independent thinking. In the process of self-learning, students' problems become richer and freer, some knowledge requires teachers to relearn. Teachers' pressure is greater, but after repeated research and practice, the professional level of teachers is rapidly improved. In the teaching process, teachers should not only improve their teaching ability, but also pay attention to the full use of teaching methods. For students, this teaching mode is more liberal and autonomous, which requires students to learn independently, to discover and learn together, so as to cultivate students' self-learning ability in information society [9]. Through the eight guidance of the teacher, the students know the teaching structure and content of the course. Students use the teaching materials and the network curriculum resources to study independently, and use the test to check their learning effect. For the freshmen, this way of teaching has laid a good foundation for them to develop good autonomous learning and self-control. After the investigation, we find that students generally accept and welcome such a teaching mode.

**Achieving the Separation of Teaching and Test.** Passing test uses the third party certification platform test system. In the teaching process, the mode of teaching and test is cancelled, so as to ensure the fairness and impartiality of teaching. The role of teachers has changed from the traditional knowledge transfer to the guide of student learning[10]. The role of students is changed from passive acceptance to active participants in teaching activities. Students have significantly improved their learning enthusiasm and computer operation ability after passing the test.

## Conclusions

Teaching reform is a long and arduous work, and it can't be achieved overnight. The first step has been taken in the curriculum reform of Zhuhai College in Jilin University. In this paper, the teaching reform of the basic computer course of the university is taken as the experimental background, and a solid teaching method has been adopted to achieve a good teaching effect. However, we must see that there are still many problems to be solved in the course of teaching reform. The stereoscopic teaching method is a kind of multi factor and multi-level teaching method. The application of the three-dimensional teaching method will be further deepened and further explored.

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## References

- [1] Y.Dong: The Design of Multi Dimensional Teaching Resources for the Basic Computer Course of the University[J], *Science and Technology*, 2015(36):264-265.(In Chinese)
- [2] Y.Dong: Three-Dimensional Teaching System Counstruction of Multimedia Technology Course[J], *Modern Computer(professional edition)*, 2010,8:53-55.(In Chinese)
- [3] C.W.Yu and J.P.Zhang: Research on the Construction of Three-Dimensional Teaching Resources Based on the Network Learning Society[J], *China Educational Technology*, 2011,6:70-75+91.(In Chinese)
- [4] X.Y.Guo, W.Liu, W.W.Fu and J.Wang: Stereoscopic Teaching Practice and Thinking at the Core of Teaching Website[J], *China Educational Technology*, 2009,6:81-84.(In Chinese)
- [5] Z.H.Xiang and X.X.Peng: Discussion on the Construction of Three-Dimensional Teaching Resource Base Based on Big Data[J], *Fujian Computer*, 2016,11:163-164.(In Chinese)
- [6] W.Gao: Research on the Application of Research Teaching Based on Stereoscopic Teaching Materials[D], Yangzhou: Yangzhou University, 2013:102-104.(In Chinese)
- [7] X.M.Wen, F.X.Meng and Y.C.Si: The Exploration and Practice of the Construction of the Three-Dimensional Textbook of Computer Science[J], *PC Fan*, 2017,4:93.(In Chinese)
- [8] Y.W.Zhong: Journal of National Academy of Education Administration[J], *Journal of National Academy of Education Administration*, 2012,1:43-47.(In Chinese)
- [9] J.Wang, Y.Zhu, Z.Lv and G.Zheng: *Multimedia Technology and Application*[M], Beijing:Tsinghua university press, 2015:3.(In Chinese)
- [10] Y.H.Yang: Research on the Reform and Innovation of Computer Teaching in Multimedia Network Classroom[J], *Contemporary education practice and teaching research*, 2017,12:7+9.(In Chinese)