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Analysis of network experimental teaching new ideas on individualized teaching

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ABSTRACT

Individualized teaching is an education method advocated in modern teaching, and the practicality of experimental teaching is very strong. So the network experimental teaching of individualized teaching concept has its special advantages. However there are some limitations existed in the information processing of china's present stage of the communication technology. And the well development of the remote experimental teaching in the modern distance education is a challenging task. Experimental teaching is an essential and practical teaching process in many teaching activity, and many disciplines are based on the experimental courses. In this paper, the network experimental teaching method will be further discussed under the concept of individualized teaching.

KEYWORDS

Individualized teaching; Experimental teaching; Network; Virtual environment.

INTRODUCTION

To achieve a real sense of fairness in Education

The education thought of china is more influenced by that of traditional education. So the implementation of layered teaching has a lot of difficulties for different levels of students, and the uniformity of traditional way of teaching has not achieved a real sense of fairness actually. However the true fairness is hidden by the false fairness. People's learning affairs is more influenced by genetic and external factors, therefore the differences in score is very normal and individualized teaching is the real sense of the reasonable teaching methods. The excellent students are not satisfied, while the backward students can't fully master the knowledge. This phenomenon needs to be further considered by educators.

To make sure the center position of the students in the education teaching activities

With an increasingly competitive society, the education is more valued in modern society. On the one hand strengthen quality education is put forward, and on the other hand education is also influenced by traditional education ideas. The educators haven't carried out modernity and personalized education needed in modern society among students which aims to increase students' learning confidence and know their learning status. Only find out their position can they take advantages of their fortes, and the most suitable education methods for different students can be found only by fully understand the students situation.

Changing the traditional position of the teachers'

In the traditional teaching activities, the teacher is act as the master of knowledge and is a symbol of authority in the class. However this way of teaching usually ignores the students' characters and the differences among the students. And the individualized teaching taking the student as its center and combining with the characteristics of students, has set up the targeted teaching task and teaching goals.

The overall structure of individualized teaching methods is as below Figure 1:

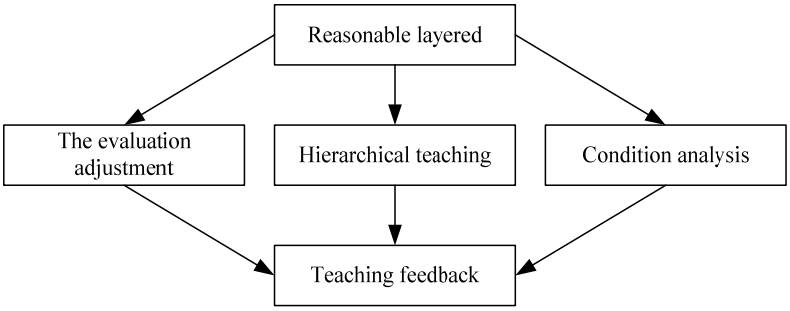

Figure 1 : The overall structure of individualized teaching methods

THE FUNCTION OF EXPERIMENTAL TEACHING ON THE DEVELOPMENT OF THE STUDENTS' ABILITY

The experimental teaching is a teaching activity outside the class, and based on the individualized teaching, the network experimental teaching can well assist classroom teaching to improve the teaching quality, meanwhile the practical and thinking abilities of the students are also well developed as well as the ability of innovative thinking and problem solving. The science teaching is based on the experiments and the interpretation of theoretical knowledge must be assisted by experiments, and the teachers' interpretation of theoretical knowledge is just groundless without the experiment. Now the syllabus has clearly put forward to cultivate the students' observing ability, thinking ability, and experiment ability, etc. The complex experimental phenomena and experiment process require the students having delicate, sensitive and comprehensive abilities, and the cultivation of these abilities is gradually formed in the experiment. The operational ability of students can also be cultivated in the laboratory course. The development of these experimental abilities can't be achieved just by teacher's explanation, and it requires students to operate in person. The laboratory course is the process of using the brain and hand, in which the students' ability to observe and experiment can be developed as well as students' thinking ability. The formation of students' ability can't be separated with the teachers' purposeful and planned cultivation. At the same time students computer ability has also been greatly improved.

THE NETWORK EXPERIMENTAL TEACHING DESIGN OF EDUCATIONAL TECHNOLOGY COURSES

The computer network experiment design can be roughly divided into four parts: the establishment of experimental goal, the selection of experimental contents, the design of experimental process, the evaluation of the experimental results. The following Figure 2 is the overall structure of the network experimental teaching design.

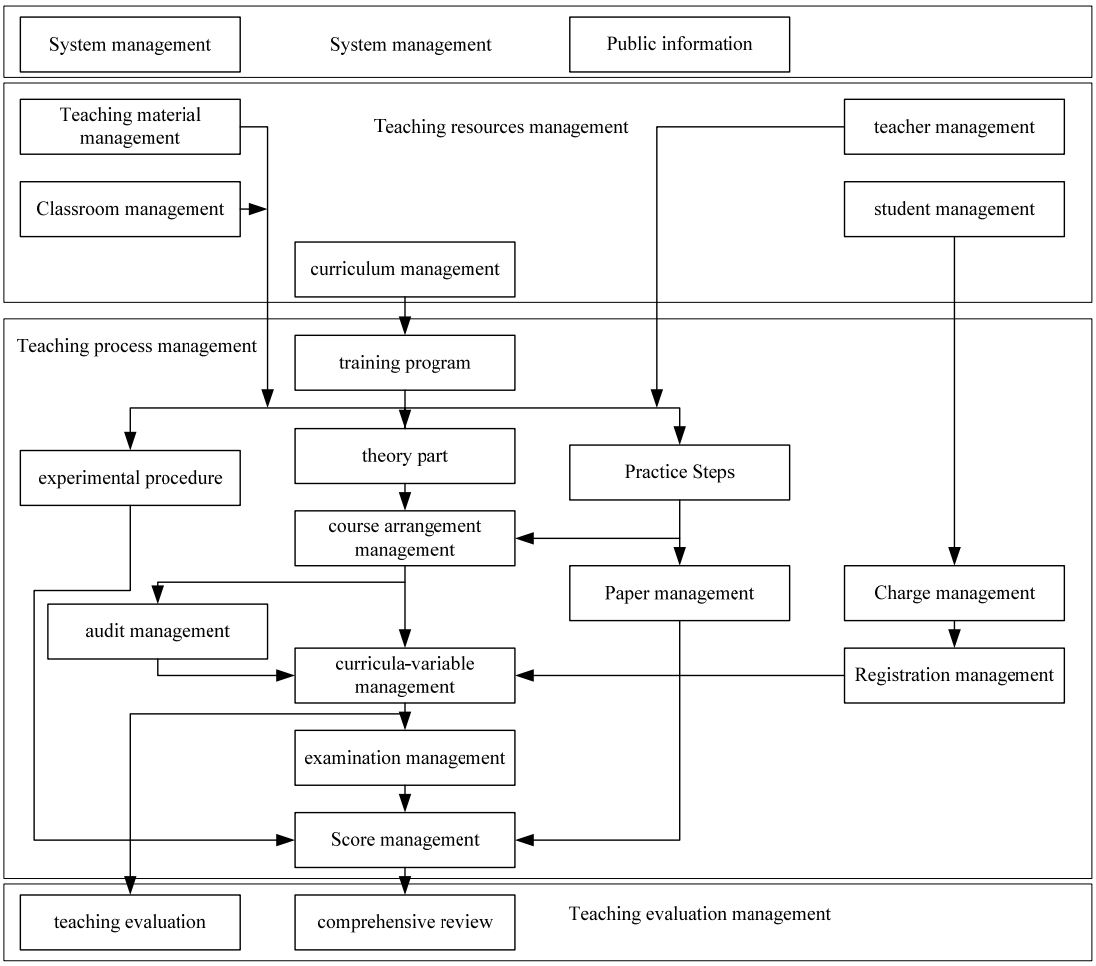

Figure 2 : The overall structure of the network experimental teaching design

The goal setting of computer network technology layered experiment

First of all, similar to the layered model of computer, the idea of layered design is also carried out in the experimental design of computer network teaching. The overall goal is through a series of experiments and teaching activities to improve relevant ability and quality of students eventually. And on the basis of above, two layered targets conforming to the science teaching and the social development are purposed. Firstly, students can complete network experiment process of planning, design, formation and test independently. Secondly, the student should experiment different network interconnection. The realization of the two hierarchical goals is a process of mutual complementary. Achieving the planning and design of experiment is the premise and basic condition of the latter goal, while the formation of the latter goal is the deepening and development of the previous goal. Around the formation of the two goals, ten related experiment projects are designed, and this is also the third layer experimental goal relative to the two former. As shown in the Figure 3:

The contents of the computer network technology experiment

The selection of experiment contents is the most important part in the whole procedure, and it is also the problem of computer network technology experiment. The content selection of the computer network experiment teaching should conform to the following principles: firstly, the principle of practicability, the goal of the network experimental teaching is to achieve usability, Whether the content is practical related to students' degree of devotion in teaching contents and their interests, and it is also related to the students' adaption to the social requirement in the future. Network experimental teaching is also a strong professional technology course, involving a wide variety of knowledge and many experiment contents, so the selection of experiment content must conform to the principle of practicability, and in this way, students meeting the needs of social development can be cultivated. Secondly, the principle of novelty, the outdated experiment content is very unfavorable to the cultivation of the students. On the one hand, it can't satisfy the demand of students in experiment class. On the other hand the students' cultivation can't be achieved, either. What's more, the computer network teaching is a new discipline, and it is also a rapidly growing discipline. The ever-changing experiment content and form can ensure the innovation vitality of the experiment teaching and promote the realization of experimental teaching goal. Thirdly, the principle of expansion, there are some learning disparity in different students, and various teaching plans are implemented based on the difference according to the individualized teaching concept. Therefore, the uniform experiment should have basic part and also the

expansion part in order to meet various needs of different students. That is to say, the design of each experiment should meet both all the requirements of the experiment outline and expansion knowledge outside the experiment outline. Fourthly, the principle of comprehensiveness, that is to say the generality and particularity of each experiment shall be connected organically so as to mobilize students' learning enthusiasm and initiative. This is also an important characteristic of network teaching and students' comprehensive ability of using knowledge can be cultivated. Fifthly, the principle of operability, although some experiments meet all the requirements of the above principles, it is unexpected due to failure of operability influenced by a series of the external environment such as equipments. And the students can't finish the experimental purposes normally. Only follow the above major principle, can the real experiment content suitable for the students' be designed.

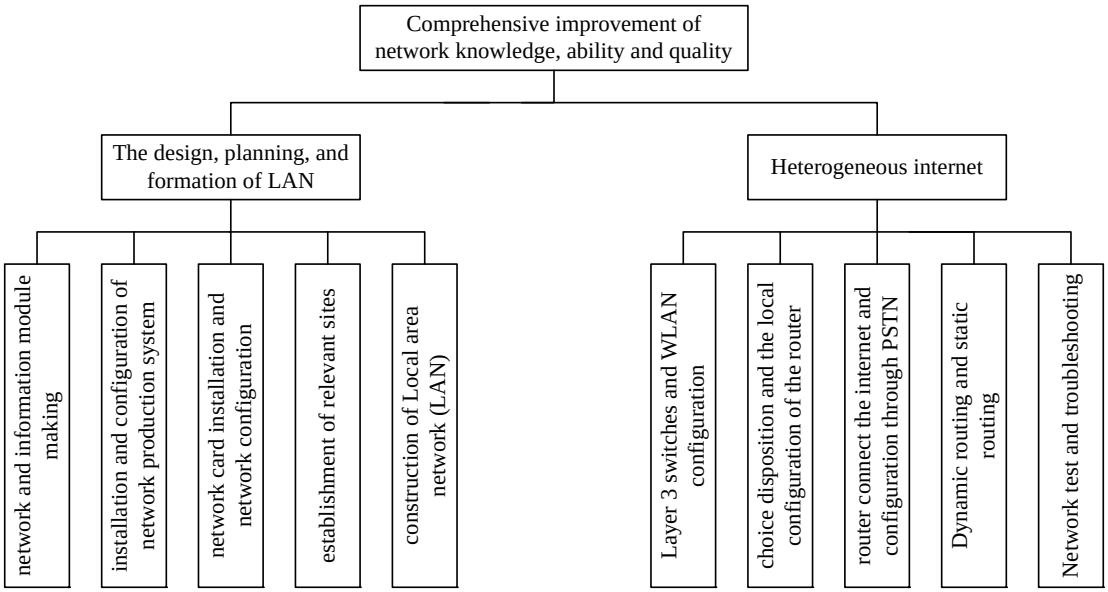

Figure 3 : Computer network technology layered experiment

The design scheme of computer network experiment teaching process

The process design is also the specific process design of the experimental operation. And different experiments have different design process, but the types of experiment can be summed up in the following respects: demonstrative experiment, verification experiment, comprehensive experiment, design experiment, and the order of these experiment types is ranked by the increasing difficulty of the experiment. With the increase of the experiment difficulty, the experiment comprehensiveness is also increased. These experiments can be divided into two kinds, one is the validated and operational experiment and the other is comprehensive and design experiment. Among which the validated and operational experiment mainly takes the experiment manual and operation demonstration of teachers as the main teaching process. And through the demonstration of the hands-on activities for the students, the set goal is achieved. And then further master the use, connection and installation, configuration and other related process and operation method of network equipments. And the final experiment goal is the lower level. The comprehensive and design experiment is set for improving the application of student’s acquired knowledge, and this experiment type is very different from the previous experiment regardless of the teaching or the operation. Such experiments in the experimental guide books only set forth the experimental targets, requirements and provide the relevant equipments, while the specific experimental scheme is designed by students themselves. This put forward higher requirements for students, and the students shall make full use of the previous knowledge and basic experiment done before. Of course, the students' comprehensive ability of learning can be developed through this kind of experiment.

The evaluation of computer network teaching experiment result

The evaluation procedure of computer network teaching experiment result is the last procedure of the whole part, and is also a process to test whether the student achieve the experiment goal. It shall not be ignored absolutely. The evaluation of the result should be diversified, and cannot be limited in some way to evaluate the student's learning effect. There are two specific inspection ways as follows: firstly, the investigation can be completed through allowing students to participate in specific learning activities or participate in social practice, and the completion of the small social practice is the best way to evaluate students' learning effect. Secondly, the investigation can be finished through allowing students to complete the design comprehensive experiment. The above investigation method to participate in social practice sometimes will be influenced by various outside factors. In addition, practice base and place may also influence the performance of students’ true levels, and students’ learning situation can be actually tested through the teachers’ arrangement of the same degree of comprehensive experimental design topic under the same conditions in the laboratory.

THE SPECIFIC CLASSIFICATION OF NETWORK EXPERIMENTAL TEACHING

Simulation and demonstration experiment

With the teachers' elaborate design of experiment before class, this type of experiment guides the student to observe, and then through the experiment phenomenon, teachers and students jointly conclude the laws of the experiments and the experiment goal. Although demonstration experiment is a more basic way of network experimental teaching, and is also a necessary part of the experiment teaching. Under the condition of network, the teacher can complete the experiment through video presentation and animation demonstration. Video presentation refers to the process of experiment which is entirely filmed with video equipment, and then it is put on the server for teaching activities. And this skill works out well and the interference of many unnecessary factors existing in the experiment can also be avoided. The workload of animation demonstration is usually very heavy, and the teachers can complete the production and design of the whole process by using the computer software. However, the animation demonstration has some advantages. For example, some processes in the actual operation can't be clearly observed, but it can be demonstrated in animation by the teacher. What's more some unnecessary parts can also be cut to make the experimental goal more clear and concise.

The remote experiment using network to transmit data, processing, and control

This experiment method is that students input the data through the computer connected to the network, and then the data is transmitted to the server through the network, and after that these data is processed and controlled by the server, the relevant experimental equipment work is carried out to collect the experimental data, and then transmitted to the student's computer. In this experiment, students can control the remote experiment equipment through the control of the computer, and the experimental data can be collected through the remote device. At the same time, the data handler provided by the server can be used to deal with the data, obtaining actual operation and experimental equipment.

Network virtual experiment based on virtual instrument technology

A lot of professional equipment in science and engineering cannot be used directly by most students. However, the virtual instrument technology kai provides the students with the use of some professional equipment on the screen. The virtual instrument technology has the character of efficient, flexible, opening, easy to use, Update fast, powerful, cost-effective, user-defined and so on. So it can improve the experiment efficiency of students', thus reduce the cost of the experiment, the enthusiasm of students for experiments can be further increased, achieving a good experimental results. If the virtual instrument are not adopted, and instead students use fixed bench top instruments which has the unified function. With the high price and relatively complex operation, the students will have great difficulty in using them at first. And meanwhile the instrument after damage has great economic losses, so the teaching goal cannot be finished.

A variety of instruments software packages can be developed by using modern computer technology. And even a complete system of laboratory equipment can be finished by using one computer. In this way, huge funds of laboratory equipment can be saved and the experiment target is also completed. Under the condition of network teaching, large amount of virtual instrument software packages needed in experimental teaching can be placed on the server. Through the network, students can download package to do experiment or carry out the experiment on the interface of the server. Connecting the internet with virtual instrument, a virtual laboratory based on WEB can be formed with the internet and virtual simulation laboratory. Therefore, the student learning is not limited by time and place, and students also can implement various virtual experiments in their computer through browser.

Establish a virtual WEB laboratory

The virtual experiment based on WEB refers to create a visual 3 d environment in the WEB environment, and each environment represents a type of experimental subject. The student can operate three-dimensional object through the means of human-computer interaction provided by the system. In this virtual environment, various experimental environments can be designed according to different subjects and experiment types. The virtual experiment environment shall have the basic function as follows: firstly, provide three-dimensional environment based on WEB. Secondly, provide visual operation mechanism. Thirdly, provide visual experiment object. Fourthly, provide experimental exchange mechanism among users. Fifthly, provide experimental collaboration mechanism among users. The virtual WEB laboratory can create a virtual environment very close to the actual lab for the students, and through the interactive operation of three-dimensional object the students complete the experiment and finish the experimental teaching tasks, at the same time the teachers' experimental teaching target is also achieved.

The above four experimental methods and types expect the first simulation experimental demonstration, the rest are connect with each other, each other between the cross and complementary lie in each other, and also can be comprehensive used

CONCLUSION

Network education is an important direction in modern education, and experiment teaching is an important part and teaching procedure of science learning. How to realize the experimental teaching in network teaching environment and finally achieve the subject teaching goal is a hot issue of network education research. In this paper, relevant method purposed

can be referenced. In terms of the network experimental teaching, virtual experiment will be the direction of future. With the development of the society and the improvement of network information, network experimental teaching will be perfect in the future.

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