

# *Demonstration and Training System-Based Teaching Reforming on Computer Fundamental Experiment*

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**Abstract**—Due to the teaching experience on Computer Fundamental Experiment, demonstration and training system-based teaching reform is purposed. The demonstration and training system takes effect through the whole process of teaching, learning and practice, and also provides supporting for independent learning. With this system, new experiment teaching pattern and methods are introduced with practice teaching examples. This reform scheme can provide some reference for other computer domain experiment teaching.

**Keywords**—*experiment teaching; demonstration and training system; computer fundamental; teaching pattern*

## I. INTRODUCTION

Computer Fundamental is a public basic course faced undergraduate students in major universities in China. The goal of this course is to introduce the basic computer system information to the students and make the students mastering the basic operating skill of computer system, as well as train the student's awareness and ability of solving the practice problem with computer system. Regarding the strong practicality of the course, mastering the principle of computer system and the cultivation of the practice ability depend heavily on the experiment teaching [1]. On the other hand, the traditional experiment teaching pattern does not meet development of the teaching requirement; the experiment teaching cannot achieve the expected teaching effect.

In recent years, the author has been engaged in the experiment teaching of the course Computer Fundamental. Three outstanding problems have appeared during the experiment teaching which are list below:

One teacher or two, but too many students. It is difficult to manage the students effectively and also impossible to provide each student with enough tutorship. Some students may be slipshod in learning because of lacking ability or the teaching too busying.

Lacking of a preferable practice platform. Without this platform, the students cannot link the classroom knowledge with extracurricular training. It is difficult for the students to master the key points learned in the class and improve the practical ability.

Traditional teaching patterns still being widely used. The traditional teaching patterns such as explaining, operating, tutoring and summering are no more match modern class. It is too boring to encourage students' study interest. Also the passive operating training is harmful for cultivating students' practice and innovation ability.

In response to these problems, this paper proposes a demonstration and training system-based teaching reforming scheme on computer fundamental experiment. In this reform, new experiment teaching methods and patterns are innovated based on the demonstration and training platform. As for its actual effect, the reform improves the quality of experiment teaching effectively.

## II. CONSTRUCTING A DEMONSTRATION AND TRAINING PLATFORM WORKING IN ALL THE PHASE INCLUDING TEACHING, LEARNING AND TRAINING, AS WELL AS SUPPORTING AUTONOMOUS LEARNING

In the Flash-based teaching demonstration and training systems, teaching content is showed in the form of movie clips, and a teaching and practice platform is provided with which abstract content becomes intuitive, invisible content convert to be visible, and practicing non-actionable becomes possible[2]. In this way, classroom teaching becomes more lively and interesting, and using of interactive systems promote student applying computational thinking to solve problems, and to cultivate students' computational thinking ability[3]. Therefore, an interactive multimedia system named Computer Fundamental Experiment Teaching Demonstration and Training System is developed with Flash technology and VBScript language.

There are five modules in the system including brief introduction for experiment teaching, verification experiments, designing experiments, synthetic experiments and simulated experiments assessment.

1) Brief introduction for experiment teaching. This module mainly introduces the general teaching purpose, content, requirement and teaching method of experiment teaching.

2) Verification experiments (Basic module): The main contents of verification experiments are the basic computer system operations including system installation and configuration, OS operating, usage of common software and so on. This kind of experiments allows students to master the basic operation manner by verification. Due to the limitations of lab hardware conditions, students cannot open the computer case to check the hardware, cannot try to configure BIOS. In order to cultivate students' practical ability of using computer system, the module provide a simulated and interactive way by which students can dismantling the host, configure BIOS, and further enhance the computer skills of students.

3) Designing Experiments (Advanced module): The main content of this module is the usage of Microsoft Office software including MS Word processing, PowerPoint designing, Excel processing. These experiments present the experiment request in the form of "task" requiring the students using relevant knowledge and skills to design in order to cultivate the students' innovation ability. During the process of the designing experimental teaching, students are encouraged to broaden their thinking, dare to innovate, design a "different style" plan. Teaching activity takes tasks as the guide, and students can achieve goals through the real operation of Office software.

4) Synthetic Experiment (Synthetic module): The main content is synthetic usage of all skills including multimedia application technology, information collection, and information processing and information presentation. These experiments present the experiment request in the form of "Topic", consciously apply all the skills learned in the previous chapters in the topic. Teachers can set the scope of the subject, but also the students can determine the subject. The module take topic as the guide, aim to train the students using the computing thinking to analyze the problem ,and using computer to solve the problem.

5) Simulated experiments assessment (Examination module). This module includes assessments of three types of simulation experiments list above. Students can take simulated assessment according to their learning situation purposing of consolidating and improving their basic computer skills.

The demonstration and training system covers the basic requirements of three kinds of experiments such as verification experiments, designing experiments and synthetic experiments. The three types of experiments are presented in the form of tasks or topics, requiring students to use relevant knowledge and skills to solve problems. In this way, students are trained to develop their computer thinking ability[4].Each type of the experiments contains basic experiments and expansion experiments. In experiment teaching, teachers can not only rely on experimental teaching content publishing system before

course to help students with poor knowledge do some preparation for their experiment, but also can adjust the intensity and difficulty of the experiment according to the learning situation of the students. It is helpful to meet the different needs of different levels of student.

### III. EXPLORING THE DEMONSTRATION AND TRAINING-BASED TEACHING METHODS OF TASK-DRIVEN EXPERIMENT TEACHING

The so-called "task driven" teaching method refers to the thought and method by which the teacher has class like following: the teacher firstly designs and prompts an experiment task according to the teaching topic, then the students are driven by to task to analyze and discuss about the task and are guide to complete the task, and when finished the task the knowledge system is constructed by the student himself[5]. The demonstration and training-based teaching methods of task-driven experiment teaching has replaced the traditional methods of teaching and operating for some reasons. First, the teaching content of "task driven" teaching method are rearranged and designed according to the task or subject, it is emphasized on the aspect that knowledge and skills should be taught by completing typical tasks and the students should master the key points by finished the assigned task. Second, under the guidance and help of teachers, students carry out independent exploration and collaborative learning surround typical tasks. In this kind of teaching activities, students can develop the habit of active learning[6].Students in the learning process is always in a dominant position. In the task process, the student is always in a dominant position and the teacher plays the role of the creator of learning scene, the designer of learning tasks, the provider of learning resources, the arranger of learning activities and the guider of the learning methods. The learning activity fully reflects the idea that learning is the subjective part and teaching is the dominance factor.

### IV. CREATING ALL NEW TEACHING METHODS FOR EXPERIMENT TEACHING BASED ON THE DEMONSTRATION AND TRAINING SYSTEM

With the supporting of the demonstration and training system, the teacher's teaching plan, implementation and assessment, as well as the students' before-class preparation, in class learning and after-school consolidation organically combined together. It makes teaching and learning complementary and mutually dependent. As the result, the all new teaching patterns for experiment teaching are created which fulfilled the idea the subjective learning and dominance teaching[7].

The teaching and learning process of typical experiment class based on the Computer Fundamental Experiment Teaching Demonstration and Training System is Shown in Figure 1. In this process, the teaching process consists of 3 stages including preparation before class, teaching in class and expansion after class. The main work in the preparation stage is to public the system and preparing the teaching contents. In the in class teaching stage, several work are arranged including clarifying the task and subject, guiding to explore certain problems, guiding to induct the problem-solving ideas,

explaining the key points and demonstrating and training, carrying out the experiment in different levels and Summarizing at last. In the after class stage, teacher should do some reviewing and try to improve the teaching activity. Students have the same three stages. In the preparation stage, students should do some preparation for the lesson. In the in class learning stage the following work should be done: understanding the tasks and its' requirements, analyzing and discussing and exploring new knowledge, researching deeply and solving the problem, creating new activity and training thinking ability, expanding experiment content, showing the result and composing report. In the last stage, reviewing and

consolidation are necessary for the students. In the whole process, the teacher's part and the student's part are integrated and complementary.

The following takes the Word Processing experiment teaching as example to demonstrate how the teaching patterns and methods based on the demonstration and training system is applied in the teaching process of Computer Fundamental Experiment Course. The main content of this lesson is the basic operation of Word Processing including document layout, creating table, image-article mixed layout. Among these content, creating table and image-article mixed layout is the key points. The specific teaching process is as followed:

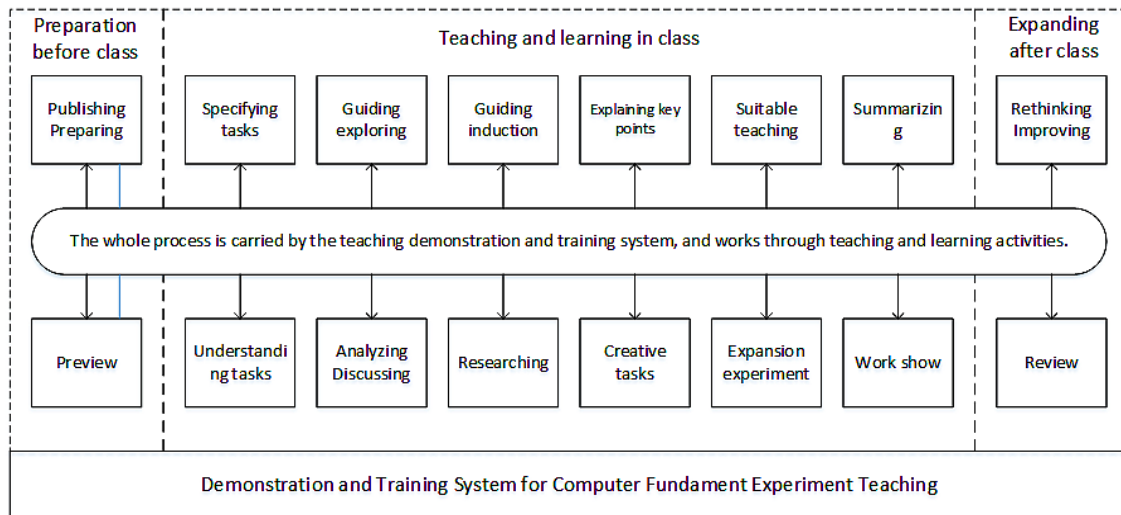


Fig. 1. The experiment teaching pattern on the demonstration and training system for computer fundamental experiment teaching

1) Publishing System –preview. Teacher publishes the preview outline through "demonstration and training system", and students use the system to preview so that students can grasp the Word2007 work interface, and learn the basic skills themselves based on the demonstration and training system.

2) Specifying tasks – understanding requirements. Teacher publishes the task through the system, "If you are an editor of the college newspaper in charge of editing the network psychology topic 'flipping heart', how do you start it?" The students act as the editor, obtain the document resources through the demonstration and training system, and start planning, editing the document "flipping heart".

3) Guiding exploring – Analyzing and Discussing. Teachers guide students to analyze the problem, clear the scope of the problem, carry out the theme and content designing, and determine the main content and document material. Through analysis and discussion, the students get clearer about the methods, key points and the process of solving the problems.

4) Guiding induction – researching deeply. Teacher leads the way to solve the problem, induce the process of document production consists of the steps including planning article, making title, text layout and modification. Students can carry out autonomic learning and researching dependent on the system in order to mastering the skills of creating well-formed documents. This is the goal of this experiment.

5) Explaining key points – creative task. When most of the students finish the basic task of the experiment, teacher will explain the key points of this experiment such as how to create the table and how to set up the text and image together and so on based on the demonstration and teaching system. Teacher will demonstrate the operations to the student when explaining. At the same time, teacher will encourage the students to try some advanced topics such as hot keys, shortcut, etc. in order to In order to consolidate the knowledge and draw inferences about the content.

6) Suitable teaching – autonomous choosing. Teacher assigns an obligatory task and an optional task. The obligatory task is to create a resume with complex tables and the optional task is to make a new year greeting card about campus life. Students are required to finish the task(s) according to their ability.

7) Summarizing – composing report. Teacher can take in-class exam using the demonstration and training system in order to find out the learning effect of the students in time. Meanwhile, teacher can selects the outstanding works and show them to the class making students learn from each other. When finished experiments, students are required to compose experiment report in a prescribe format and submit it. The report can reflect the students' ability of language organizing and inducting.

8) Rethinking and improving—reviewing. After class, teacher should summarize and compose the teaching experience. This will help him improving the process of teaching. Students can review the content by the system to get some improvement.

#### V. CONCLUSION

The demonstration and training system of Computer Fundamental teaching shows the teaching content in the form of animation clips and user interaction which make the class more lively and interesting. With this system, tasks and topics are integrated into the experiment teaching content and encourage the students to master the knowledge and skills by completing tasks. The practice shows that the new teaching methods and patterns completely subvert the traditional teaching manner like “one book and one teacher result one experiment”. Within the demonstration and training system, students can master the basic skills with autonomous learning and teacher’s guidance. Teacher is freed from directing all the students and can spend more time on training and encouraging the students’ innovation ability. In the aspect of teaching effect, the students have strong interest in learning and researching, and the learning efficiency is improved significantly. The survey at the end of the semester shows that 91% of the students are accept the new methods and patterns and hope it expended to other courses. According to the statistics more

than 93% of the students pass the exam, higher than the last year by 10%. And as a result, more students had passed the National Computer Rank Examination. Therefore, the reform program can be reference for other computer domain experiment class.

#### REFERENCES

- [1] XU Lijuan, CHEN Qinghai, WANG Aiji, Research on the reform of Computer basic practice teaching system. [J] Computer Education, 2012 (2): 28-31. (In Chinese)
- [2] CAI Lijuan, QU Guoxian, A Study on Interactive Design of Flash Animation. [J] Art and Design(Theory), 2007 (3): 75-77. (In Chinese)
- [3] Research Group on Chinese Universities computer basic education reforming, The courses system of Chinese Universities computer basic education [M]. Beijing, Tsinghua University Press, 2006. (In Chinese)
- [4] TIAN Yunsheng, LIU Weihua, WANG Jingchun, Exploration and practice on construction of comprehensive and designing experimental projects[J]. Experimental Technology and Management, 2012 (2): 126-129. (In Chinese)
- [5] GUO Shaoqing, The connotation of task driven teaching method [J]. China Educational Technology, 2006 (7): 57-59. (In Chinese)
- [6] ZHAO Xiwu, Practice of College Computer-based Teaching Based on Project[J]. Computer Education, 2010 (2): 102-104. (In Chinese)
- [7] GONG Peizeng, YANG Zhiqiang, The cultivation of Computational Thinking in College Computer Basic Teaching [J]. China University Teaching, 2012 (5): 51-54. (In Chinese)