Research on Teaching Reform and Practice of Computer Application Foundation Course

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Abstract: Nowadays, computer foundation teaching is facing many difficulties due to the rapidly developing and widely popularizing of computer science. The reform of the teaching of "computer application foundation" is bound to put forward new requirements for the teaching material of this course. In order to meet the requirements for the knowledge structure of talents in colleges and universities in the information age, in the basic computer course teaching reform, some universities from the original "focus on teaching and computer experiment" teaching model into students rely on stereoscopic teaching material for autonomous learning. After a semester course of study, 2012 non-computer major students in computer proficiency level 1 certification exam throughout the country increased by nearly 10% pass rate.

In recent years, due to the conduct of primary and secondary education in information technology to improve the starting point for university computer foundation education. The first basic computer course -"Computer application foundation" teaching by teachers teaching students in accordance with the unified ability to choose the level of learning content to learn both the need, but also possible. The reform of the teaching of "computer application foundation" is bound to put forward new requirements for the teaching material of this course.

I. Localization of stereoscopic teaching material construction of "computer application foundation"

With the popularization of information technology education in basic education, freshman students not only have high computer skills, and most of the high school have a certain self-learning ability. "Fundamentals of Computer Application" course survey for grade 2011 students in my school found that the basal level of computer freshmen get rid of "Beginners." Its number is 4550 copies of valid questionnaires, Specific survey results are shown in Table 1.In addition, 72.1% of students in high school have basically said that to develop the habit of self-learning. With the rapid development and application of computer technology, computer skills has become an important part of the knowledge structure of contemporary college students[1]. For the change of the students start learning ability, "computer application foundation" as the first university computer basic courses of training target, not only to enable students to master the computer, network and other relevant basic knowledge of information technology, more important is to cultivate students use information technology tools to analyze and solve the problem of consciousness and ability, the use of computers to solve problems in this field, improve the students' information literacy.

Table 1 grade 2011 students' computer level

level / model	beginner	Very familiar	mastered
Windows operating	2.7%	16.6%	66.33%
word	3.9%	15.8%	60.5%
ppt	5.2%	17.5%	56.7%
excel	10.6%	11.3%	44.4%

In order to meet the requirements for the knowledge structure of talents in colleges and universities in the information age, in the basic computer course teaching reform, some universities from the

original "focus on teaching and computer experiment" teaching model into students rely on stereoscopic teaching material for autonomous learning. "Computer Application Foundation" inevitable reform teaching and learning materials for the course proposed new requirements[2].

II. The overall planning of stereoscopic teaching material construction of "computer application foundation"

"Computer application foundation" course content with practical, comprehensive, creative, tool, and the characteristics of the stronger times. "Computer application foundation" course content with strong practicality, comprehensive, creative, instrumental, times, etc. With the advanced teaching theory and learning theory, network, multimedia and other modern information technology as the support, fully embody the characteristics of flexibility, openness, dynamic, three-dimensional, the "computer application foundation" in our school curriculum reform focuses on building the "text teaching - learning auxiliary disc - network learning platform[3,4] - skill training" four in one of the teaching material. Four in one of the three-dimensional teaching material to the learners' cognitive characteristics provide different levels of learning content and goal requirements , as much as possible to the student's personality and learning style differences, to provide the most suitable learning materials for each student, to build the most appropriate media resources and the environment, to optimize penetration of learning methods .Three-dimensional materials focus of each part is different, different teaching and learning process in the course of the functions served.

1)Written materials in accordance with the requirements of the syllabus in tasks way which leads to the chapters of the knowledge and skills, can let the student through the solution of the actual task to systematically master the application of skills and knowledge of this course.

2)The learning auxiliary disc is to expand the text material, the emphasis and difficulty task in the process of resolving the various chapters of the operation make into a CD-ROM, and with the original operating documents, to enable students to intuitively understand the whole process of solving the task.

3)take advantage of convenient online learning content updates, fast delivery, high resource capacity, resource diversification presents the advantages of having diversity in the teaching content, dynamic volatility, expanding on the part of the e-learning platform, Students can browse to the landing platform for teachers to learn the curriculum guide, and look at each stage of learning the teacher homework and suggesting reading content. Top students can browse the extended knowledge to grasp more knowledge; through the interactive forum, between students and teachers, students and students can learn this course to discuss with each other.

4)I-tutor computer skills training platform build a highly interactive environment, teaching, practice oriented, the "task driven" teaching mode, lets the students learning in the process of solving the problem, and gives the evaluation of real time and the feedback and dynamic multimedia teaching link, achieves the effect of experimental teaching one to one.

III. The design of stereoscopic teaching material construction of "computer application foundation"

"Text teaching - learning auxiliary disc – network learning platform - skill training" the four part complement each other. They have repeatedly, stressed, crossed and complement, complement each other, forming an organic whole teaching resources to improve the teaching quality.

A. The design of text material

As the primary textbook is positioned to meet the needs of independent learning, so write the textbook must always stand in the perspective of the students to think about how to make students learn efficiently complete the task. The textbooks in "problem solving, task driven" as a guide, from students attention problem, loved the task to start, guide students from simple to complex, from easy to difficult to complete related tasks, and grasp the knowledge structure in the process of completing the task, drive the knowledge, concepts and skills learning. According to the characteristics of the students of our school, we design the task of "the purchase of new computer"

to make students understand the microcomputer composition, performance parameters and assembly and maintenance knowledge; through the completion of "computer system maintenance" task, students understand the installation, optimization and backup system knowledge; to take care of students' daily the cost of living and statistics to learn the Excel module; to "retrieval –download-application- sharing" information resources as the main task for students to master the knowledge of network application module.

In order to enable the students to participate in the learning task, complicated the textbooks is develop the capacity of students as the main line, in accordance with the "problem (task), to solve the problem (doing), inductive analysis (summarize), expand innovation" the gradient progressive mode organize the textbook . In addition, set up "try to experience", "thinking and practice" and other columns in the textbook, to inspire students through trial and exploration to discover, to encourage them to infer other things from one fact; Set the "related resource guide" column, guide students to complete the case study at the same time, can obtain extended learning tasks and resources in the counseling CD, grid learning, encourage students to obtain knowledge and skills, improve process and methods by completing the extensional task.

B. The design of learning auxiliary disc

By limiting the length of the textbooks, it is impossible to use all the tools and working principles are presented in the textbooks, and special multimedia animation with an intuitive image display, the operation demonstration, explain the process, simulation demonstration, skills training and other animated learning aids on the CD, and strengthen student to learn knowledge and skills.

To meet the diverse needs that the students use information tools, the use of some common tools introduced in the textbook , the method and works of using other tools are on the disk, so that students can choose to study some of the information according to the needs.

C. The design of network learning platform

Make full use that the website content update easily, fast delivery, high resource capacity, resource presents the advantages of diversification, we will have the part of teaching content with a diversity, dynamic, volatility, expanding on the site ,to compensate for the textbooks content length is less than the update cycle.

1)Function of learning platform

Network learning platform mainly consists of interactive learning system and monitoring evaluation system. Interactive learning system can let the teacher according to the students add, modify online learning content, extended online learning resources, and the layout of self-testing, discussion, homework online activities; Students can receive on the platform guidance of learning method of knowledge point and abundant examples of extended, students can choose the example of professional extended learning, students can also complete the job submission, share learning notes, Q & A and discuss etc. in the platform. Course evaluation system to track and manage the students' autonomous learning activities, can not only provide students login times, online time, performance statistics function, can also record students learning time in each stay knowledge module, providing scientific reference data for the analysis of learning behavior of students.

2) Design of online learning content

In a powerful learning platform support for this course, we designed a series of online learning content (task). Online learning is not a simple "books to move", but to guide students through browsing each learning activities (tasks) know which chapters should be read in the textbook for studying the knowledge? Which video disk can be browsed? Which experimental tasks is required in the training platform? Which extended examples is browsed in different professional knowledge? Which hands-on exercises and interactive discussion need to complete? How much learning time should be used? So that students in the process of independent study always have learning tasks and goals clearly, rather than aimless free learning.

The selection of Online learning content and text teaching material content is repeated, stressed, and cross and supplement. As the task "the Internet learning resources" the organization of contents in the "network and application of computer "module, textbooks focus on how to search the Internet learning resources, how to make use of the knowledge library to help students learning, online

learning content will focus on the design of the following two "hands on" task (as shown in Table 2), let the students according to their professional use text knowledge in the textbook to solute the helpful data processing tasks in their university learning, and to encourage students to share their resulting in the forum or from the study notes.

Table 2 the example of online learning task

Task 1	You show the semester course schedule, to search the web course(http://www.jpkcnet.com) to see what the corresponding learning resources of national excellent courses, and they were in IE favorites, in order to learn externally read for the usual course
Task2	Go to the CORE website, registered as a course translation volunteer, use the next four years, you translate the interesting course in my spare time, and share what you find that you are interested in teaching resources in the discussion. When don't understand the professional terms, try to search the network knowledge database.

D. The design of Computer Skills Training System

With computer-aided assessment (CAA) technology has become more sophisticated, it is entirely possible to change on the part of the experimental program is assisted by the intelligent tutor system, so we built IT skills tutor system (I-tutor) in this course. In the IT skills tutor system, we have designed a total of more than 2000 different experimental knowledge modules, greatly expanded the number of experiments of the original paper experimental guide book. And I-Tutor system also distribute students to different experimental tasks based on the student's ability, and automatically determine whether the student's experiment is correct or not , and give tips, it would greatly reduce the burden on teachers, but also enable students to grasp more firmly knowledge and skills, to better cater to the learning needs of students at different levels[5].

IV. Application effect of "computer application foundation" three-dimensional materials

After the completion of the construction of three-dimensional materials, grade 2012 in our university Non-Computer Majors learn autonomously "computer application foundation" course based on the three-dimensional teaching material. After a semester course of study, 2012 non-computer major students in computer proficiency level 1 certification exam in colleges and universities throughout the country reached 71.3% pass rate, compared to 62.93% of the 2011 student pass rate increased by nearly 10%.

Then we on 2012 level students for non-computer majors conducted a teaching material construction research, most of the students in this curriculum reform "text teaching - learning auxiliary disc - network learning platform - skill training" hold positive attitude, three-dimensional learning resources for students to develop independent learning activities provide a solid foundation.

But at the same time in the survey also found that need improving three-dimensional learning resources and there are many places: such as learning CD need to continue to improve interactive interface, and part of the operation is not clear need re-recording, In network learning platform, improve the learning process, according to every learning tasks have a completed progress indicator to urge students to learn better; Meet the needs of students ,which can implement push the professional operation instance to let students in learning in the learning platform according to the student's professional background.

References

[1]Zhou Donghua, Study of educational reform in the university computer foundation course based on case-task mode and moodle platform, Advances in Information Sciences and Service Sciences,2012.9:602-816.

[2] Hao Ying; Wan Shanshan, Research on teaching system reform of fundamental computer course, 2nd International Workshop on Education Technology and Computer Science, ETCS 2010:456-459.

[3]Zhao Weidong, The application of modern teaching techniques in computer foundation education, International Conference on Educational and Information Technology, Proceedings2010:1245-1247.

[4] Li Fengyun;Liu Ying;Gao Fuxiang,Research and Practice on the Teaching Reform of Computer Fundamentals Course, Computer Science-Technology and Applications, 2009: 35 – 37.

[5] Li Hong; Wang Chunzhi, Research on teaching reform and practice of university computer foundation course, 2nd International Workshop on Education Technology and Computer Science, ETCS 2010: 708-710.