Task Driven Computer Application Teaching Management System in Vocational Colleges

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Abstract

One goal of higher vocational and technical education is to cultivate high-quality laborers and skilled practical talents. Computer application course is a comprehensive course integrating knowledge, operation and practicality, featuring fast development, practicality and wide application. Combining with the goal of higher vocational education and the students' characteristics and considering the employment problems faced by students, the teaching methods to cultivate students' abilities to analyze and solve problems so that they can quickly adapt to work needs have become a key issue in education of vocational students. A large number of teaching practice shows that the task driven teaching method can effectively optimize the computer application classroom teaching, making it more practical, having a positive effect on student innovation and independent analysis ability. This paper carried out optimization and reform for the current vocational college computer application classroom teaching based on the task driven approach, to improve the effectiveness and quality of computer application teaching, and lay a solid foundation for the future career development of vocational students.

Keywords: Task Driven, Vocational Colleges, Computer Application, Teaching Optimization, Evaluation System.

1. BACKGROUND

1.1 Introduction

Vocational education is a key part of the personnel training system in our country. The purpose is to train senior technicians who have strong professional and practical skills. Over the past 20 years of reform and opening up, the vocational schools have played an important role in the process of socialist modernization, cultivating a large number of practical talents to the country (Wang, 2013). Vigorous development of vocational education is an urgent need to promote China's industrialization and modernization. All industries in the national economy not only need a large number of scientists, engineers and management personnel, but also urgently need tens of millions of highly-skilled personnel and hundreds of millions of high-quality workers. As a branch of vocational education, higher vocational education is a key way to promote economic development, social progress and increase employment rate. It plays an important role in cultivating hundreds of millions of high-quality laborers and is an important part of China's economic and social development (Pan, 2013). However, in our country, the training model of skilled talents is relatively backward. Most of the computer application courses in vocational colleges are still a relatively dull education system, inheriting the traditional education concept and following the old teaching methods, seriously affecting the overall development of students, and cannot cultivate composite application personnel. In this regard, optimizing computer application course teaching system is currently the major issues vocational colleges should focus on.

1.2 Purpose

Based on the task driven method, this paper optimizes the classroom teaching of computer application in vocational colleges in an all-round way. This teaching method is based on the learner. The learner discovers and sets the goals from the tasks, and solves the problems and understands via autonomous learning (Zhang, 2016). First, combining task driven approach with computer application classroom teaching can enhance students' ability of computer learning and problem-solving; second, it helps students to exchange information and expand knowledge to stimulate their interest in learning; finally, we can explore a effective teaching model more suitable
for college students of computer science and technology in the context of information technology, having an important role in promoting the future career development of vocational college students.

2. THEORY

2.1 Concept of task driven approach

Task driven is a teaching method based on the constructivism theory of learning, in line with the inquiry teaching mode. The task driven teaching emphasizes that the transfer of knowledge and skills should be based on the completion of the typical tasks, and the students should learn the knowledge, gain skills and ability by completing tasks in close contact with study, life and social practice “task” context. This teaching method advocates that teachers should embed teaching content in one or more tasks, taking completing the task as the center of education. The students understand what knowledge points are involved through the analysis and discussion of the task (Wang, 2016). With the help and guidance of the teacher, through the active application of learning resources, we can find out the way to accomplish the task in the process of self-exploration and interaction and collaboration, and finally realize the meaning construction by accomplishing the task. Figure 1 shows the task driven teaching process.

![Figure 1. Task Driven Teaching Process](image)

The guidance of teachers and the body students are interactive. Teachers design an assignment and a teaching process, to promote students to play a dominant role and take the initiative to complete the tasks: The more fully play the role the student main body, the more problems you will find. When the problem cannot be solved, ask helps from others and teachers, at this time, teachers are promoted by students, and can play their guidance role (Song, 2016). The dominance pushes the main body, and the main body promotes the dominance, until the completion of the entire teaching. As an intermediary of teachers and students' interaction, the tasks promote the whole classroom teaching. The task driven teaching process is an active interaction among teachers, students and tasks.

2.2 Features of task driven approach

The characteristics of task driven teaching: interaction among tasks, teachers and students, that is, the task-based line, the teacher guidance and the student main body. (1) Task-based line: The core of task driven teaching method is assignment design. The task runs through the entire teaching process. Classroom teaching adopts task-based line. Teachers and students interact around the task. The student will accept an assignment and finish the task. (2) Teacher guidance: In the traditional teaching mode, the teacher is in the dominant position, and often speaks to the students during the class. When the students listen, the students passively receive the knowledge and their enthusiasm cannot be fully mobilized (Tang, 2016). The task driven teaching under the guidance of constructivism requires teachers to change their traditional role from the traditional authoritative role of imparting knowledge to a mentor for student learning. Teachers not only guide students in learning content to achieve learning objectives, but also guide students in learning methods and skills. (3) Student main body: From a student's perspective, task driven is a learning method, suitable for learning computer applications knowledge and skills. Students are the main body of learning. The task driven teaching plays the main body position of students.

2.3 Constructivism

Constructivism holds that knowledge is not obtained through the teaching of teachers, but obtained by learners with the help of others (including teachers and learning partners) using the learning resources and construct through meaning in context, that is, social and cultural backgrounds (Shen and Huang, 2016). Construction is not
only the construction of the meaning of new knowledge, but also the transformation and reorganization of the original experience. The core of Constructivism Learning Theory is: Students as the center, emphasizing students’ active exploration of knowledge, initiative discovery and initiative construction of the meaning of knowledge learned. Figure 2 show the teaching model based on constructivism.

![Teaching Model Based on Constructivism](image)

**Figure 2. Teaching Model Based on Constructivism**

(1) Analysis of teaching objectives: determine the topic of learning, that is, knowledge related to the concepts, principles, methods or process. (2) Analysis of students’ characteristics: design problems that are suitable for students’ abilities and knowledge levels, to provide help and guidance that is suitable for learners’ personality, and to design questions and learning resources suitable for students’ situation. (3) Analysis of characteristics of learning content: clarify the learning knowledge, structure and the category of knowledge (Song, 2016). The tasks cover the system of knowledge as defined by the teaching objectives, embedding the learning content into different elements of the learning environment by the type of knowledge. (4) Design learning tasks: Constructivism learning is problem-driven learning; to propose questions is the core and focus of constructivism teaching pattern. Learning problems can be problems, cases, projects and analysis, which represent continuous complex problems. Principle to propose the question: The questions should be meaningful under the real situation, imply the knowledge to be taught. (5) Construction of learning situation: Constructivism emphasizes learning under the real situation, and reduces the gap between knowledge and problem solving and emphasizes the cultivation of knowledge transfer ability (Liu, 2017). Learning situation refers to providing students with a complete and true background of problems as a support for initiating teaching so that students have learning needs; Three elements of a learning situation: the context, the presentation and simulation, and the operating space. (6) Learning resource design: Understand the background and meaning of the problem. Construct your own intelligence and put forward the hypothesis of solving the problem. The learner needs to know the information about the problem and need to learn the necessary preparation knowledge. (7) Cognitive tool design: cognitive tools are mental model and equipment to support, guide and expand the learners’ thinking process. (8) Autonomous learning strategy: models and methods to arrange the elements of the learning environment to support and promote students to learn effectively.
The core is to play the student’s initiative, enthusiasm, and fully reflect the cognitive body of students. (9) Management and help design: Teacher’s responsibilities: control, management, help and guidance; the key is whether teachers can adapt to the changes of roles and responsibilities. (10) Summing up and strengthen training: concise serial teaching to obtain system student’s knowledge; testing and practice to strengthen the knowledge learned to achieve the teaching objectives.

3. CONSTRUCTION OF VOCATIONAL COLLEGE COMPUTER AND APPLICATION TEACHING OPTIMIZATION SYSTEM BASED ON THE TASK DRIVEN METHOD

3.1 Teaching content

The analysis of learning content is to clarify the learning content, the structure and the type of knowledge content. The learning tasks cover the knowledge system defined by the teaching objectives; The learning contents are embedded in various elements of the learning environment by types of knowledge (Zhang, 2015). Figure 3 shows the relationship between the task and the teaching content (This paper mainly includes web design content).

![Figure 3. The Relationship between the Task and the Teaching Content](image)

3.2 Teaching process

The learning process comprises of two stages: closed task completion process and open task completion process. In the closed task layout, the teacher’s activities include: Prepare examples and guide students to watch them and understand the structure of website, requiring students to make a resume website, and give evaluation and feedback (Chen, 2015). After the close task is completed, teachers should actively encourage students to use the resources to create websites according to the website structure. At the same time, students should be given individual guidance to solve practical problems.

In the open task layout, teachers’ activities mainly include: provide various materials and websites, guiding students to propose different tasks, complete issues for producing web pages, and group students rationally (Cui, 2015). The activities of students include: carefully think the tasks proposed by the teachers, the group learning and discussion, and establish a detailed plan. Figure 4 shows the frame design of teaching process.
3.3 Teaching evaluation

3.3.1 Content

A combination of methods is used for evaluation of student learning: score, group cooperation, attitude, final works and other methods to obtain accurate assessment of the students' learning outcomes (Wu, 2015). The teacher evaluates the students' mastery of the knowledge and skills related to the production of web pages after the students complete their learning activities; Through group cooperation, teachers evaluate the cooperation performance of students in collection, analyzing, processing and organizing information; through evaluation of learning attitudes, assess the student's learning preparation, group activity participation, study attendance and others; through evaluation of work report, assess the group learning outcomes. The students' scores of the above four assessments are as follows: teacher's score * 60% + self-scoring * 20% + companion’s score * 20%.

3.3.2 Methods and steps

In this paper, the steps for teaching evaluation combining the fuzzy comprehensive evaluation method and the gray system theory are: (1) First, set up the factor set, which is a set of indices composed of the evaluation indices: \( A = \{a_1, a_2, ..., a_n\} \). Second, set up an evaluation set, which is a collection of the quality of the evaluation objectives: \( B = \{b_1, b_2, ..., b_m\} \). The weight matrix of the indices is obtained by the AHP: \( X = [x_1, x_2, ..., x_m] \), where \( x_1 \) is the weight value of each indicator. Carry out the consistency test according to the following formula to analyze its credibility: \( RE = \frac{RJ_n}{EJ_n} \) (Yuan, 2015), where \( RJ_n \) is the evaluation consistency index of the n-th order judgment matrix, \( EJ_n \) is the average consistency index of the n-th order inverse matrix. When \( RJ_n \leq 0.01 \), the assessment could be considered compatible and the analysis is credible; On the contrary, it could be considered that the assessment inconsistency was high and the evaluation should be revised.

(2) Construct the single factor evaluation matrix \( W \), where \( W_{i} = [w_{i1}, w_{i2}, ..., w_{in}] \) is the evaluation result of the i-th factor:
The normalized comprehensive evaluation model can be calculated by this formula:

\[
\sum_{j=1}^{i-1} g_{j1} = 1 + 1/2 + 5/2 + 3/1 = 19/3, \sum_{j=1}^{5} g_{j2} = 1/2 + 1 + 2 = 13/3
\]

\[
\sum_{j=1}^{5} g_{j3} = 3/7 + 2/3 + 1 + 1 = 37/15, \sum_{j=1}^{5} g_{j4} = 3/1 + 1/2 + 1 + 1 = 15/5
\]

Conduct test calculation based on this by the formula:

\[
\beta_{\text{max}} = \frac{1}{m} \sum_{j=1}^{j} (\frac{R \cdot W}{j})
\]

Then determine the relevancy order by calculating the gray relevancy:

\[
\eta_{j}(g) = \frac{\min_{i} \min \Delta i(g) + p \max_{i} \max \Delta i(g)}{\Delta i(g) + p \max_{i} \max \Delta i(g)}
\]

\[
p \in (0,1)
\]

\[
\Delta_{j}(g) = |R'_{j}(g) - W'_{j}(g)|
\]

\[
\eta_{j} = \frac{1}{k} \sum_{i} \eta_{j}(g)
\]

\[
g = 1, 2, ..., n
\]

3.3.3 Results

By the learning effects of this topic, the student response to the task driven teaching method is better than the traditional teaching methods. Judging from the degree of students like the teaching mode, only 9% of students in this class like the traditional teaching mode, and 61% like the new teaching mode, 22% say they are general, only 8% do not like the new teaching mode. The task driven teaching method has promoted the students’ learning of computer application courses, and the vocational students can get a good exercise in information literacy, cooperation and communication awareness and other aspects (Zhuo, 2013). According to the above evaluation method, the final evaluation shows that 74% of the students prefer that the teachers decide the course grades based on the quality of finished works and their usual performance, and do not like the exams. Another 26% of students prefer to submit papers and web pages or report as a form of evaluation. As can be seen from the above data, the implementation of task driven teaching model has achieved good results, effectively promoting students’ learning and improving the quality of learning.

4. BRIEF CONCLUSION

For computer as a practical course, task driven teaching method is an effective teaching method suitable for information technology teaching. But in the application, the selection of tasks, the setting of scenarios, the relationship between teachers and students, group cooperation, the control of classroom teaching progress, and the feedback of information will directly affect the effectiveness of task driven teaching and affect the design of the optimization system of computer application classroom teaching in vocational colleges. Teachers must fully understand the meaning of the task driven method and related theories. In addition, teachers should design the teaching program based on the students’ characteristics and courses, orderly carry out the teaching to ensure the quality of each teaching link, improve the effectiveness of teaching, and guarantee innovative curriculum system and teaching mode, so as to improve students’ innovative awareness and ability, improve their practical skills and cultivate more talents in the computer field for our country.
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