Study on Project Experience Based Computer Education in Vocational Colleges

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Abstract. This article analyzes the status of computer education in vocational colleges and the main problems of computer education in vocational colleges, and discusses the characteristics and the essentiality of new teaching pattern of computer education in vocational colleges. To enhance the information literacy of students, we should try to explore how to improve the quality of teaching information technology. Currently, one of the main objectives of computer education reform in vocational education is to change the traditional teacher-centered teaching pattern, and build a new teaching pattern in which teachers playing the leading role and students' cognition could be fully reflected as well. Finally, the article discusses the advantages of applying the project experience based learning pattern in the computer education in vocational colleges.

Keywords: project experience, vocational colleges, computer education, teaching pattern

1. Introduction

Over the years, the leading computer teaching in vocational college is to be summarized as "teacher-centered, classroom-centered and textbook-centered" teaching pattern which is a cramming method; it greatly hindered the spirit of innovation and practical ability of students, which composes tremendous inertia resistance in promoting quality education in basic education. Computer information technology education in vocational colleges is not the simple summarization of "traditional educational pattern" and "Internet"; the traditional "passive cramming method" must not be applied in computer technology education. The effective way to change the situation is to explore the brand new computer technology education/teaching pattern. The so-called brand new teaching pattern is mainly reflected in the following aspects: 1. a new concept in education and teaching; 2. a new understanding of the relationship between subject and object in the teaching process; 3. a new functional advantages in the modern education technology; 4. a new creation of scenarios in the teaching; 5. a new role and the relationship between the teachers and the students; 6. a new diversity of teaching pattern application.

Applying the project experience based learning pattern in the computer education provides the implementation platform for the realization of the idea of curriculum reform proposed in the "Outline". Therefore, we can make the project experience based learning pattern as a breakthrough of information technology education, in which students solve a series of projects for creative learning, in order to enhance information literacy, foster innovation and self-learning ability, that helps the students prepare to adapt the community better.

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2. Overview Of Project Experience Based Learning

Project experience based learning pattern is derived from currently popular international "Project-based Learning" in education sector. For example, the U.S. Education for Master of Business Administration (MBA) has developed a unique teaching method based on their long teaching experience, including Case-based Learning, Simulation-based Learning and the Project-based Learning and so on.

People often hear the term "project", which refers to things categorized by nature. In the field of education, the term "project" refers to a series of surveys, observations, researches, and the expression of new knowledge, presenting and sharing learning activities carried out around student-selected topics. Such activities are generally sub-group, and some students work them independently.

"Topic" is the thing in real world which the students interested in and worthy of their attention and detailed investigation.

The center of "Project-based learning" is learning the concepts and principles of discipline, the purpose is making works and showing their works to others. It's a new learning pattern in the real world, which has a variety of resources to carry out exploration activities, and solves a series of interrelated issues in a certain period of time. Project-based learning seeks to integrate students into a meaningful process of completing the task, and enable students to actively learn the construction of knowledge independently, finally, realize the student-generated knowledge and ability to train up the highest achievement of objectives.

Constructivism advocates learner-centered learning under the guidance of teachers, which stressed the role of the learner's cognitive subject, meanwhile, never ignoring the guiding role of teachers; teachers are the facilitators and guider, rather than imparting and instilling knowledge. Students are the main information processor and active constructer of meaning, rather than passive recipients of external stimuli. Link the things reflected by the current learning content with the things you already know, and pay it a serious thinking. "Linking" and "thinking" is the key point of meaning construction. If you can combine the process of linking and thinking with the negotiation process in collaborative learning (i.e., the process of communication and discussion), the efficiency of constructing meaning will be higher, the quality will also be better. Consultation should be divided into "self-consultation" and "mutual-consultation", self-consultation refers to self-argument to decide what is correct; mutual-consultation refers to mutual discussion and debate within the learning group.

3. Application Of Project Experience Based Educational Pattern In Computer Teaching

Project experience based learning is a new teaching pattern, and an innovative new concept of traditional teaching, this pattern is student-centered, which stressing cooperative learning groups and requiring students to explore the authenticity of real life. Usually the processes or implementation steps are project selecting, planning making, activity exploring, work producing, experience sharing and activity valuing.

In project-based learning, project selecting is extremely important, it should be selected according to their interests, while teacher is only a guide in this process, which means that a project can not be imposed upon students, teachers should evaluate the topics selected by students. At first, whether the selected project is related to the daily life of students; secondly, whether the students have the ability to carry out the selected project should be considered, and the project should be multi-discipline integral, such as nature, mathematics and languages. Again, the project should be rich. Finally, schools have the ability to study the project for testing. In short, project-based learning, teachers should fully consider whether the items selected by students with research value, and whether students have the ability to study the project. Based on the evaluation of the situation, if necessary, students can choose the appropriate adjustments to the project, or proposed to re-select the students on the project.

Content of the project are the detailed arrangements and activity plan for study time. Schedule is a general plan of time required for students to learn the project, a detailed time schedule should be made. Activities plan is to make pre-planning upon the project-based learning activities involved, such as experts to be interviewed, specific division of the staff, where to get information.

Activity exploring phase is the main body of project-based learning, most content knowledge and skills of students are learned during this period. It directly studies the necessary group locations, objects or events. In the investigation process, the students necessarily record the activities and their own views or feelings about the activities, and propose solutions to the problem of assumptions, then use certain research methods and technical tools to gather information; secondly, the information collected should be handled and processed, they may verify or disprove the hypothesis or assumptions proposed at the beginning; finally, solutions or results of the problem should be worked out.

Production making is an important feature of project-based learning, which differed from the general teaching activities. Students complete the making using the knowledge and skills acquired in the learning process. The production can be varied with uncertainty form; it could also be produced by using a variety of information technologies. Study groups express their knowledge and skills acquired in the project through presenting their research results.

After the production was made, the study groups need experience exchanges gained in the learning process, and share the success and joy. The form of exchanging results can be varied, such as holding exhibitions, lectures, debates, small competitions. In the results exchanging, in addition to our leadership staff, teachers and students, we can have guests outside the school, such as parents, teachers and students from other schools and leaders and experts from other higher education authorities.

An important difference between project-based learning and conventional teaching is the learning assessment. In this teaching pattern, the evaluation is required to be completed by the experts, scholars, teachers, peers and the learners together. It not only requires the evaluation of the results, but also stressed the evaluation of the learning process; it's really a good combination of quantitative evaluation, qualitative evaluation, formative evaluation and summative evaluation, the evaluation of the individual and the group, the evaluation of them and others.

The content of evaluation includes the choice of subject, the performance, plans, schedules and results presenting of the student in the group learning and so on. The evaluation of the results emphasize the degree of grasping of knowledge and skills, The evaluation of the process emphasizes the experimental records, all kinds of raw data, log sheet, questionnaire, interview form and learning experiences.

In the making of evaluation criteria or evaluation gauge, the first purpose of the evaluation can objectively reflect the classification process and the important dimension of results or important aspects of relative behavior, and then develop evaluation grades for each area, which reflecting the different levels, it can be divided into 3 or 5 levels, such as "Excellent", "Good", "Average" and so on. If necessary, we can set different weights for different indicators. For relatively important evaluation, it should select some of the students pretest or pretest before the formal evaluation, in order to inspect whether the evaluation is appropriate or not, and make adjustments and modifications. Indicators of evaluation gauge must be comprehensive and concise. We can organize students to participate in the gauge developing, or instruct students gauge and evaluation criteria before the evaluation so as to guide and motivate their learning.

4. Advantages Of Applying The Project Experience Based Teaching Pattern In The Practice Of Computer Teaching

Project experience based learning is different from the traditional practice of acceptance, students are not taught to listen to teachers, but expertise to select the appropriate topic to learn according to their interests. Project-based learning fully mobilizes the students desire to learn and improves their motivation to learn.

The meanings of applying the project experience based teaching pattern in computer teaching are mainly shown in the following areas:

4.1.   To Improve Problem Solving Ability

Project-based learning is not a simple reproduction of knowledge by students, but creatively solves problems or creates a new and unique product. Perkins took the view that high-level cognitive skills to improve students need to engage students in problem-solving tasks, which requires students to provide guidance on how to solve the problem. The ability of students is neither a natural formation, or a teacher could teach, but developed in the use of knowledge and the process of exploring knowledge. Focusing on the level of knowledge and understanding of the objectives is a low-level goal, and focusing on the application level above the target is a high-level goal, only the high-level goals can be effective in bringing up the ability of students. In project-based learning, students studying a topic they interested in require their application, analysis, synthesis, evaluation knowledge, the knowledge contained in each topic is not individual and determined, but a comprehensive knowledge, so students can use their own intellectual strengths and play their wisdom. For example, divergent and critical thinking from several angles. Therefore, project-based learning is conducive to ability development of students. Generally, project-based learning should experience several stages, such as discovering problem - questioning - analysis – hypothesis and assumption - evaluation - verification - conclusion, these stages can help every link in the ability development of students. In the stage of discovering problem and questioning, the students find the interested topics in the vast knowledge and ask questions, they learn how to research and explore their own way, which is a kind of ability itself. Discovering problem and questioning could teach the students how to think independently. In the stage of analysis and assumptions, the students need to think from different angles and solve the problem. In this stage, it generally has two kinds of thinking, one is analytical thinking, and another is intuitive thinking. Analytical thinking is a kind of deductive reasoning process, which is characterized by the form of thinking; it has a strict logic and can be described in words. And intuitive thinking on the issue is perceived as the characteristics of the implicit form of thinking, non-logical and jumping, there are no fixed steps. In the process of analysis, intuitive thinking often acts before analytical thinking, intuitive thinking could obtain the idea of resolving the problem; while analytical thinking could test whether the idea is correct or not. Project-based learning involves more intuitive thinking. Scientific research shows that intuitive thinking and creative thinking are inextricably related; therefore, project-based learning helps students develop habits of intuitive thinking, so as to lay a more solid foundation for creation. In the process of analyzing the problem, it needs to collect information. Information collecting is also a creative work. In the process of collecting data, it needs data classification, induction and consolidations, so that the students will gradually learn to grasp the direction of their learning, put forward their ideas and get rid of the habit thinking of "echo what other says", then think about problems from different angles and learn critical thinking. Evaluation, verification, conclusion are the representations of solving problems and creating products. Solving problem is a complex thought process, which requires students to carry out multi-angle and multi-aspect thinking, in order to further divergent thinking and concentration. Therefore, in the problem solving process, students can bring up creative thinking skills as the main characteristics of divergent.

4.2.   To Improve Information Literacy

Project-based learning emphasizes independence of students, and seeks new information from the network and communicates with others. The current computer technology and network are developing as sudden as lightning, and challenging the education area. Information technology and network world applied in education have become increasingly evident, it is mainly reflected in two aspects: outreach function, i.e. whenever, anyone

at anywhere could access to any level of information and learning resources, since in the network learning environment, there are a large amount of data, educational software, interests and other learning resources, so that anyone can express his view and share with others. Cohesive function, i.e. information technology and the network world have put a colorful world in front of the people, so that each student can put forward their own ideas, express their views and share with others. Information Literacy is defined as "problem-solving skills which determining when information is needed, identifying and finding needed information, evaluating and organizing information and effectively using of information" by American Library Association, including: cultural literacy, i.e. the relevant information perception and understanding; information awareness, i.e. the source of information and knowledge and the use of information tools; information skills, i.e. the determination of information, retrieval, evaluation, treatment and decision-making.

4.3. To Provide Learning Experiences

Duwei pointed out that "education is a development process of in the experience, because of the experience and for the experience", "experience is a process of experience at first, the process is maintenance some sorts of thing, and the process of and tolerating and generating passion, also the process of love." In project-based learning, the role of teachers and students has great changes. For teachers, more guidance and demonstration, while less giving, they do not like to be a traditional teaching - the inculcation of knowledge, but as a certain role of facilitator, the teachers search and design activities to help students and provide information and advice. For students, the students have the right to choose their interested topics to allow the project to suit their own interests and abilities, they have more cross-disciplinary thinking and discoveries, more group work while less certainty of knowledge, less reliance on secondary information, and dedicated to collecting, analyzing the information obtained, then research and report their findings. So they can keep their own learning process and experience accumulated, and migrates to the new situations. Therefore, project-based learning is a process enabling students to become more experienced in learning.

5. Conclusion

Project experience based learning is a learning pattern based on constructivist learning theory and multiple intelligence theory, which is widely prevalent teaching pattern in the U.S. This pattern could be a mirror with insignificant meanings to carry out the current computer research study and information technology based integrated learning courses of vocational colleges, which is worthy of our in-depth study.

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