Different Project Types in Project-Based Learning on Software Development Courses in Higher Vocational Education

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Abstract. From the view of educational objectives, the software development courses in higher vocational colleges belong to the subjects under the working system. It is more suitable to use the project-based learning method because it can provide each student a way to construct themselves on their own. So that students are able to have a comprehensive experience of post functions. Different project sources determine different types. There are different sources for projects and it’s not possible to get a conclusion which is the best one generally. So how to choose a proper project is not easy. According to years of practical experience in the software development specialty in higher vocational college, it’s found that each kind of these project types has their own specific occasions in practice, which can offer help to act according to actual circumstances.

Introduction

Higher vocational education aims at cultivating students’ professional ability and comprehensive quality, focusing on training practical talents to meet the needs of economic and social development. The main emphasis of it is to build students’ ability to acquire knowledge independently. All of these objectives are based on specific teaching and learning, it can’t be achieved without concrete model of instruction. The traditional model centers on the inheritance of knowledge, the acquisition and preservation of information, and students mainly study indirect knowledge passively. It neglects the cultivation of students’ innovative spirit and practical ability. This is contrary to the requirements of higher vocational education.

On the other hand, the students’ learning ability has made the traditional teaching methods hinder. The traditional way always asks students to remember knowledge mechanically. However, students in domestic higher vocational college don’t have enough learning motivation, strong interest in learning, appropriate learning methods, and great understanding at present, which always makes students feel bored and exhausted in traditional model.

Focus on the software development specialty, students are required to be able to analyze problems, solve problems, cooperate in teams, try and correct errors quickly. All of these brings challenge to the traditional teaching methods.

Along with the introduction of project-based learning, the above problems have been solved to a certain extent. However, how to choose projects has become another unavoidable problem.

The Definition of Project

“Project” comes from the Latin word “proicere”, which means planning, design and program. Some scholars have proposed that “in higher vocational education, the project refers to a valuable task of producing or designing a specific product or work for practical application”. It can be seen the importance of project results in project-based learning. Combining with the original intention of the project, it’s believed that the project in project-based learning at the stage of higher vocational education should be a series of planned, designed and programmed learning tasks.

Firstly, there should be one or more planned practical problems to be solved during the learning process. The plan should cover at least when to finish, where to practise, why to do, what to deliver,
who to participate, how to evaluate. It means the project should be given specific time and place to carry on, and should reach an agreement in result format and enough available resources, and evaluation criterion.

Secondly, all of the tasks in the project should be designed as student centered. Students have got their own experiences and views from life, no matter the problems they have met or not before, they can always form an explanation and put forward their hypothesis based upon their past experience and their cognitive abilities finally. In the design, learners’ existing knowledge and experience must be considered as the growth point of new knowledge, so that students can gradually enrich or adjust their explanations. It’s necessary to design a good learning environment so that students can learn through experiments, independent inquiry, cooperative and other ways.

Thirdly, the procedure of finishing each task even to the project should be programmed clear. So that students can allocate resources independently, monitor and control the progress and quality by themselves, and improve their multiple intelligences gradually, which include linguistic intelligence, logical-mathematical intelligence, spatial intelligence, bodily-kinesthetic intelligence, musical intelligence, interpersonal intelligence, intrapersonal intelligence and naturalist intelligence.

Above all, the project in the project-based learning should be a practical problem to be solve, which could be designed into a series of purposeful and meaningful tasks. The ultimate goal is to enable students to achieve development and growth.

In the software development specialty, there are many kinds of projects from various sources. What characteristics they have and how they can be put into practice when learning, this is a question. For details, see below.

**Real Projects**

The real projects can come from enterprises, teachers’ research area, or it can be problems from individuals in life. Its most typical feature is “authenticity”, which can be reflected in demand, inquiry, cycle, value and so on.

In this way, the requirements for both teachers and students are relatively higher. For teachers, they should not only have rich teaching experience, but also have rich practical experience. For students, they should not only be familiar with project-related professional knowledge, but also be able to divide work, cooperate and learn the unknown business logic involved in the project.

Typical example of using this kind of project is in Nanyang Polytechnic College in Singapore when students do their graduation design. Teachers design tasks according to the requirements of enterprise projects, lead students to participate in the completion of projects. Ultimately project can meet the expected requests of the enterprise, and students can achieve the learning objectives.

At present, many higher vocational colleges adopt such modes as "school-enterprise cooperation" and "combination of production and learning" to carry out education. Such cooperation can achieve a win-win situation in theory. For schools, the goal of personnel training is more clear and targeted, and the projects in enterprises provide great convenience for project-based learning activities. For enterprises, the project results produced in the teaching process can save lots of cost for enterprises, which improves efficiency. Those students who are familiar with the enterprise’s projects also can become the human resource pool for their sustainable development.

**Clipping Projects**

Because of the inherent authenticity of the real projects, it has hard indicators on the time and performance requirements of the results. However, the projects cycle of enterprise does not coincide with the teaching cycle at school definitely, and the degree of difficulty does not match with the acceptability of teachers and students exactly. Such problems will hinder project-based learning. Therefore, a great number of projects used in current project-based learning are not purely real projects, but projects clipped from real projects.
When using clipping projects in software development courses, teachers need to identify the project source first, then analyze and disintegrate it, then intercept the functional modules that can meet the learning needs, and determine time, design tasks and results to achieve the learning objectives.

Compared with real projects, there aren’t more advantages in application. They don’t have enough relationship with the outside world, and there are few part of audiences to the project result.

**Virtual Projects**

It’s a common phenomenon of "from school to school" among teachers in higher vocational colleges in our country. They do not only lack practical experience of enterprises, but also do not have enough real project sources. Therefore, in the project teaching of software development courses, many teachers try to mine curriculum resources from real enterprise projects, so that learning content can have a direct relationship with actual activities (such as discussing needs, delivering results on time, etc.). They construct “virtual” problems to be solved in the classroom, so that students have the opportunity to plan, design and implement independently.

Such a project is not a real project, nor is it a clipping project, but a virtual project which can serve the project-based learning on the basis of mining, analyzing, understanding and refining the real project. The effect of using virtual project to teach often depends on the ability of teachers' design and plan. Therefore, it’s better to be demonstrated by a team of teachers.

According to the Project Based Learning Handbook (2003), a project should be evaluated from 6 aspects, they are authenticity, academic rigor, applied learning, active exploration, adult connection, assessment practices.

From this point of view, both the clipping projects and virtual projects are not more advisable because they are short in authenticity, applied learning and adult connection. But in considering of learning at school, it’s emphasized that students are the principal part of cognition and the active constructor of knowledge. As long as students can construct themselves from the projects, and finally get improvements in multiple intelligence, it could be used in practice.

**Summary**

From the above analysis, it can be found that the real project has real situation, specific data and complex business, which is more suitable to use in the comprehensive practice or training before graduation. The clipping project is a project processed by teachers, whose situation is real, the data is a little specific, the business logic is targeted, and it is suitable for use in the routine learning process. If the real project can not be obtained, or to be clipped, with the result that there isn’t any usable projects during the learning process. In this case, virtual projects can also be used, but in the design step, the situation should be as realistic as possible, and the data should also be reasonable as possible.

The key of project-based learning is not the final product itself, but the process of development and creation of the product, which should be constructed by students themselves. A high-quality project can serve the project-based learning well, promote the improvement of students' autonomous learning ability, stimulate students' creative potential, and cultivate their ability to analyze and solve problems.

Students in software development specialty in higher vocational colleges need to improve their self-study ability, strengthen their learning initiative, and to be sensitive to knowledge-based content. Through solving problems in useful, interesting and effective projects, students can achieve curriculum objectives.
References


