Exploration and Application of Micro-project Learning in SCM Classroom Teaching Reform

Zhongbao Ji\textsuperscript{1, a}
\textsuperscript{1}Wenzhou Polytechnic, Wenzhou 325035, China.
\textsuperscript{a}14644404@qq.com

Abstract
In the modern society, the pace of life is getting faster and faster. Corresponding to this, people will accept with pleasure a simple, convenient, interesting and efficient way of life and learning. "Micro culture" was born quietly and formed many micro communities-micro blog, wechat, micro movie, micro novel, etc.. This is a "micro" era. Many micro functions in the micro era not only bring revolutionary impact to traditional Internet applications, but also have a great impact on the field of education. Micro courses are relatively independent and complete small-scale courses organized by theme modules, which have flexible forms, including methods, stories, phenomena, films and television, etc. Micro curriculum attracts students with its unique charm and becomes a new curriculum form in the modern curriculum system. Micro curriculum makes learning simple and enlightens us a new learning concept: "micro". Combined with the project learning content and the understanding of micro courses, micro resources and other "micro" concepts, to overcome the shortcomings of long project learning cycle, small degree of freedom, redundant project tasks and so on, this study puts forward the concept of micro project learning, explores the new teaching model of electrical single-chip microcomputer courses in higher vocational colleges, improves the teaching effect of single-chip microcomputer courses, and further better promotes students' professional skills and comprehensive ability.

Keywords
Single-chip microcomputer, micro project, higher vocational colleges, classroom teaching reform.

1. Introduction to Micro Projects
There is no clear definition of micro project learning. We can understand micro project from the concept of project. The project is a task to be completed, which must meet the requirements of certain performance, quality, quantity, technical indicators, etc., and there are time and cost constraints. Micro project is the miniaturization and simplification of project. The transformation from project-based learning to micro project learning is a process in which teaching activities become more efficient, flexible and practical. In essence, micro project learning is a flexible application of project learning, combining the concepts of project learning and micro curriculum. In this paper, the meaning of micro project learning is defined as: Micro project learning is to project learning content, through situational micro theme tasks, let learners get more complete and specific knowledge and skills in practical experience, internal absorption, exploration and innovation, and effectively improve learners' learning interest, cooperation ability and practical innovation ability. Project tasks in practical work are transformed into learning micro theme tasks. Teaching is contextualized and miniaturized. On the one hand, it can promote learners' immersion learning; on the other hand, learners can complete project works in a short time to achieve efficient classroom. As a idea and system of
methods, micro project learning is organically combined with practical problems, including a good driving problem, collaborative exploration, public display of works and other elements. Through "learning by doing" and group interaction, learning efficiency and comprehensive ability are improved, with the following basic characteristics:

(1) "Micro". The first feature of micro project learning is micro, which not only means "less time", but also means simplifying complex content and making simple content interesting. Learners really experience "learning once in a minute, thinking once in a second", which will not be difficult to accept. They can see the learning effect in a class hour and enhance their sense of self-efficacy.

(2) Driving problems or challenges. A good driving problem oriented learning goal, stimulate the desire to challenge. Micro project learning starts from an eye-catching practical project, which contains the core knowledge and skills to be learned. Learning objectives are clear, and students will naturally learn specific knowledge, concepts and operations to solve problems.

(3) Autonomy. Micro project learning creates a learner centered environment with a wide range of learning contents. Learners have more autonomy and choice rights than traditional classroom. Learners have the opportunity to conduct research in combination with their own interests, set their own learning progress, determine and implement problem-solving solutions, exercise their ability of self-management and obtain a sense of achievement.

(4) Inquiry. Compared with the infusion of knowledge, inquiry and internalized learning can make learners remember what they have done clearly and persistently, which has a far greater impact on learners than knowledge itself. Micro project learning takes meaningful situation as anchor point and project as guidance, explores solutions and creates new products to maximize learning potential. Through learning inquiry, learners construct new views, new perspectives, and generate new ways of self display. Finally, they solve a complex and meaningful problem or challenge. The process of solving the problem is similar to the research process of subject experts. Students learn and apply the subject ideas in the process of inquiry.

(5) Collaboration. Everyone has their own learning experience, with different assumptions and inferences. Micro project learning provides a space for self-expression and a platform for discussion. Students, peers and teachers cooperate with each other, analyze problems and exchange ideas. Learning is no longer lonely. Micro project learning creates feasible products or products that can solve problems. When homework is no longer for teachers' inspection or examination, students will pay more attention to the quality of homework, especially in the form of public display.

2. Current Situation and Background Analysis

At present, the teaching reform of higher vocational colleges is progressing rapidly, and the curriculum teaching reform is developing in the direction of practicality, research and practice. Designing new teaching mode is one of the directions of teaching reform in the current environment. Different teaching modes are gradually presented in the public vision, such as problem-based learning, task-based teaching and case-based teaching. However, the above three teaching modes are more or less inadequate, and it has been fully exposed that it is difficult to mobilize students' interest and enthusiasm in the daily teaching process. In addition, the single-chip microcomputer course itself is difficult and has strong knowledge consistency. In addition, most vocational college students are weak in learning abstract knowledge, so the general teaching method is difficult to adapt to the learning state of students. Therefore, it is urgent to carry out all-round teaching reform on the course of single chip microcomputer. At present, there are several problems in the teaching of single chip microcomputer:

(1) The integration of theory course and experiment course is not enough. The traditional single-chip teaching theory course and experiment course are separated and interleaved, but
the actual teaching still cannot meet the teaching requirements, there are many problems. According to the teaching calendar of the course, teachers usually complete the instruction system and some simple programming in the classroom teaching, and then let students enter the laboratory for experiments. At this time, due to the accumulation of teaching content, students have a little knowledge of some content in theoretical teaching, and their understanding of experimental content is hazy in the process of entering the experiment. Teachers spend a lot of time to explain before the experiment, and students can only carry out some results verification operations in the remaining time, and the experimental effect is very unsatisfactory. At the same time, teachers also feel that experimental teaching cannot be well integrated with theoretical teaching, and students generally feel that the experiment does not deepen the understanding of theoretical teaching, but brings some doubts other than theoretical teaching.

(2) The flexibility of experiment is not enough. The experiment teaching of single-chip microcomputer is usually carried out according to the teaching calendar in a planned way, and because of the limitation of experimental equipment, the experiments that teachers can arrange and students can try are very limited. Due to the limitation of time arrangement in the laboratory, students' unfinished experimental tasks cannot be supplemented in time, and new experimental contents need to be carried out, thus forming the accumulation of knowledge points, resulting in students' lack of interest, initiative and creativity.

(3) It is difficult to carry out comprehensive experiments. The traditional experiment teaching, usually based on the confirmatory experiment, mainly includes the use of instructions and the simple programming of programs, and seldom involves the external extended circuit of single chip microcomputer. As a result, it is difficult to carry out the design experiment including hardware development and peripheral interface circuit programming, and students' comprehensive ability of experimental knowledge is poor. Even if the curriculum design teaching process is arranged, students' ability of independent design and creation is also generally problematic. In the application of SCM, hardware development and programming for peripheral interface circuit are the most extensive. Not actively carrying out comprehensive experiments is not conducive to giving full play to students' initiative in learning, cultivating students' engineering awareness and solving practical problems.

3. Research Contents of Micro Project of Single Chip Microcomputer

3.1. Micro Project Design

To enable students to obtain the opportunity of independent learning and cooperative exploration, to mobilize students' initiative, enthusiasm and creativity in learning, to decompose scientific research projects of teachers into a number of micro projects related up and down, so as to organize teaching as a carrier, and to place the corresponding knowledge and skills points in the daily learning tasks, to provide students with as much practice time as possible, starting from the attempt, from the At the beginning of the practice, skills training will be carried out in the implementation of each project to integrate "teaching, learning, doing and evaluation" so as to achieve a high degree of unity between the teaching process and the actual work process.

The principles for designing micro projects are as follows:

(1) Principle of selectivity. Give learners multiple choices instead of compulsory tasks. In teaching, we should provide as many micro project learning situations as possible, and let students choose learning tasks freely according to their own needs or interests, so as to cultivate learners' habit of active learning. Teaching is for the sake of not teaching, and nothing is more difficult than students' active learning.
(2) Objective principle. Curriculum teaching objectives are the key basis for planning teaching micro projects. Micro projects should be designed closely around the teaching objectives. A micro project may only have one or several small points, but it should be highly targeted and have a complete structure, which not only contains the existing knowledge and skills of students, but also covers the new knowledge and skills to be learned.

(3) Feasibility principle. Micro project design should refer to the curriculum standards, starting from small, short and narrow topics. When making plans, sufficient time should be arranged to ensure that students can complete their works through independent and collaborative learning in a limited time, so as to make learning simple and efficient.

(4) Principle of interest. Interested learning projects, appropriate learning methods, good learning environment and atmosphere can keep learning enthusiasm and improve learning efficiency and effect. Micro projects should consider students’ interests, select appropriate professional projects, and stimulate students’ motivation to participate.

(5) Principle of practicality. Micro projects should be practical and specific, which can come from real projects of enterprises or scientific research projects of instructors.

3.2. Design of Micro Project Teaching Implementation Process

According to the teaching reform project of single-chip microcomputer, on the basis of the existing teaching materials, combined with the scientific research project of the teaching teacher, the teaching materials of single-chip microcomputer practical training are compiled, the teaching content is reasonably organized, and the micro project is designed with every two classes as a time unit according to the standard requirements of teaching content, knowledge goal and ability goal, step by step. The process of project learning generally includes the steps of determining the project, making the project plan, implementing the plan and displaying the works. Micro project learning is a flexible application of project learning. The process of this study is as follows:

(1) Identify micro projects. According to the requirements of talent training program and curriculum standard, the micro project of theory course and practical training course is designed, and learning resources, including video clips and courseware, are provided according to the micro project and learning needs.

(2) Clarify objectives. It is necessary to guide the students to arrange the learning progress with the learning goal as the guide.

(3) Making program. Give the initiative to the students in the classroom, encourage the students to choose the scheme according to the requirements of the course, self understanding and interest, and cooperate to discuss and determine the micro project implementation scheme.

(4) Collaborative implementation. Under the guidance of the teacher, the task team cooperates to complete the task. In micro project learning, learners can choose self-directed learning style according to their interest and skill level.

(5) Communication and display. Group presentation and experience sharing.

(6) Comment summary. Teachers organize discussion, find out problems and do a good job in evaluation. Reflect on improvement. Teachers and students discuss the problems in the process of micro project production, find out the best solution, and sort out the knowledge and skills used in the project production to help students build new knowledge.

3.3. Teaching Evaluation Design

In the past, the evaluation of single-chip microcomputer course mainly used to determine the usual performance according to the students' daily performance, and to comprehensively evaluate the students' performance according to the final examination results. The teacher played a decisive role in the evaluation of students' course performance, and the evaluation method was relatively simple. In the whole process of micro project learning, assessment and
evaluation should adhere to the principle of combining summative evaluation and process evaluation, quantitative evaluation and qualitative evaluation, and teachers' evaluation and students' self-evaluation and mutual evaluation.

1. Teachers and students work together to develop a learning process evaluation index, promote the self-evaluation of student groups, focus on the assessment of students' ability to solve practical problems, and pay attention to the evaluation of learning attitude, habits, professional quality, etc.

2. Teachers track and record the process of students completing micro projects, assess and evaluate the accuracy, rationality, proficiency and comprehensiveness of students' operation process and results. Encourage students to accumulate self-assessment and other assessment logs in the learning process and keep them in their own project folders.

3. For the items that you think have met the standard, make a mark in the box next to them, and also describe how they meet the standard in the remarks column. In the next sharing activity, talk about your own experience.

4. Conclusion

Through the implementation and construction of the mixed teaching mode reform of single-chip microcomputer course, the quality of classroom teaching has been significantly improved, and the overall teaching effect is significant, which lays a solid foundation for the subsequent reform of other courses and provides a reference. Especially in the subject competition, the level and quantity of awards are significantly improved, which will inevitably help to improve the quality of students' postgraduate entrance examination and employment. However, in order to ensure the classroom teaching quality of the mixed teaching mode, in the later stage of implementation and construction, it is necessary to continue to strengthen the transformation of teachers' teaching concept, improve teachers' comprehensive teaching ability with the core of information-based teaching ability and practical ability, especially the ability of MOOC production, flipped classroom organization and condensed engineering project cases. At the same time, with the strong support of the relevant functional departments of the school, we must strengthen and expand the function construction of the independent learning platform, and further improve the hardware facilities construction of the integrated classroom environment.

The hybrid teaching mode can meet the students' personalized learning needs, change their learning habits, stimulate their interest in learning, improve classroom efficiency, enhance their ability of independent learning, and completely subvert the learning mode that students do not study hard at ordinary times, and can pass the test by reading books and memorizing by rote before the test, which really stimulates the potential learning enthusiasm of the majority of students. At the same time, it also improves students' innovation awareness, problem-solving ability, engineering practice ability and group cooperation ability, which will highlight the training goal of application-oriented talents and adapt to the development concept of new engineering.

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