Application of SPOC Model in Training Craftsman Spirit of High-Skilled Talents

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Abstract. "Craftsman Spirit" is a necessary professional accomplishment for high-skilled talents. Polytechnic colleges should integrate the cultivation of craftsman spirit into daily teaching. In order to overcome student 's deficiency including the lack of learning motivation, a weak foundation as well as the lack of self-management ability, we established SPOC resource platform and introduce SPOC model into the cultivation of craftsman spirit. Besides, an index system was established to evaluate the effectiveness of the teaching model.

Keywords: Craftsman spirit · SPOC · Project-based teaching

1 Introduction

"Craftsman Spirit" is the precious spiritual wealth condensed by the tillers and toilers in the process of working and culture succession. Craftsman spirit is a kind of reverence for professional skills, a kind of devotion for work, a kind of spirit of striving for excellence and unremitting efforts in products and service, as well as a kind of persistence in doing a good job throughout one's life [1, 2]. Nowadays, the great craftsmen are also the important builders of socialist modernization, although technology development alters from day to day. The burden they shoulder is even related to the success or failure of the country. In order to meet the requirements of new technology, new industry and new model, the great craftsmen must master a large amount of knowledge, accumulate experience year after year, and hone exquisite skills to solve practical engineering problems. In the new era, the great craftsmen must have self-learning ability so as to keep pace with the times, constantly introduce new technologies, new concepts and new models into their work, make breakthroughs in their positions and promote the progress and development of the industry. In the Process of realizing the strategy of made-in-China 2025, it is an important mission of polytechnic colleges to integrate the cultivation of craftsman spirit into daily teaching and cultivate high-skilled talents. However, at present, the students in polytechnic colleges have weak foundation, weak self-learning ability, and they are short of good self-management ability. Many of them pay no attention to classes and even are addicted to mobile phones, so that it is necessary to adopt a new teaching mode to improve students' learning motivation.

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Small Private Online Course (SPOC) was presented in 2013 by professor Armando Fox of University of California, Berkeley. This model emphasizes the construction of teaching resources while focusing on improving students' participation. As a result, SPOC model is introduced into curriculum teaching. It is an open online course for specific and small-scale groups. It can integrate the advantages of traditional face-to-face teaching and modern online learning with information technology, which mixes online and offline teaching. If the resource platform is efficiently established and perform effectively, it can effectively improve students' participation in learning, activate class atmosphere and improve students' self-learning ability [3, 4].

2 The Establishment of Resource Platform

First of all, our college divides talents into three types based on the model of talent training, in order to overcome polytechnic college students' deficiency including the lack of learning motivation, a weak foundation and so on. The three types are professionally technical type, technical management type and technical service type. Our main idea is that let students with different personalities and interests find their own development path. Therefore, the assessment of the course is no longer simply based on their examination results. Secondly, by setting the core curriculum Data Structure as an experimental course, we show more concern for craftsman spirit in the design of teaching objectives of traditional culture courses. We can design teaching objectives according to the characteristics of course so as to excavate the knowledge which can reflect the craftsman spirit. As a result, with the immersion of craftsman spirit, our students can feel the charm of traditional culture and the importance of craftsman ship, whether theoretical or experiential teaching situation.

The implementation effect of SPOC model largely depends on the richness and effectiveness of teaching resources. We subdivide projects related to core curriculums into several tasks. Then each task is implemented to specific knowledge points. After the knowledge points reorganized, we make tutorial videos and give test questions to students through mobile client. We are committed to building a SPOC resource platform, which comes from projects, is applied to projects and is jointly instructed. With the help of virtual simulation training platform, school-enterprise cooperation, regular guidance of enterprise engineers and other superior resources, the efficient and rigorous working attitude and the atmosphere of strictly obeying industry regulations are introduced into the daily teaching of schools, in order to forming rich soil for cultivating craftsman spirit.

Relying on the cloud platform of vocational education, to improve teaching effect, we establish a set of learning model consisted of pre-class guidance, classroom teaching and after-class research. Figure 1 illustrates the learning model. Taking students of grade 14 and 15 as study subjects, this model is tested (See Fig. 1).

Through pre-class guidance, students can preliminarily obtain knowledge points while teachers can learn about students' learning situation. The emphasis of classroom teaching is on the analysis of important and difficult points. After-class research is mainly to consolidate and strengthen the knowledge learned and the application of it in the second classroom composed of skills competitions and scientific and technological

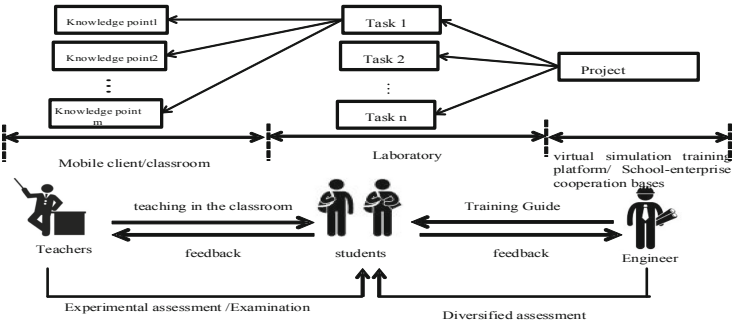

Fig. 1. Teaching resources construction of SPOC model

activities. As long as students find their own shortcomings and deficiencies in the second classroom, they will go back to the first classroom for more knowledge. A virtuous cycle forms (See Fig. 2).

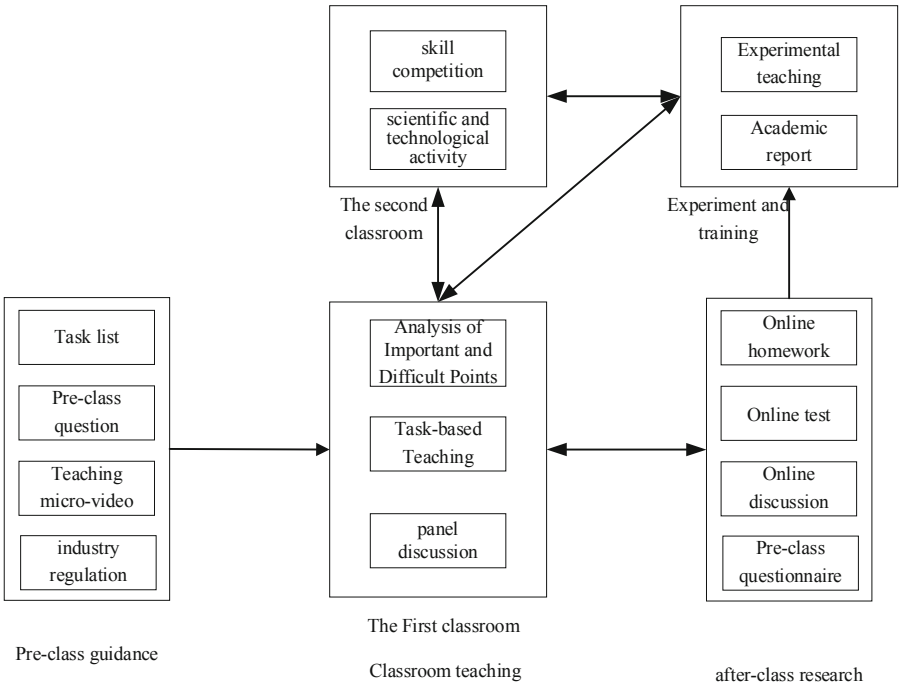

Fig. 2. Teaching resources construction of SPOC model learning model based on SPOC

3 The Implementation of SPOC Model

3.1 Pre-class Guidance

The weak foundation and poor self-management ability of students in polytechnic colleges always lead to their failure in traditional education. Their confidence is often insufficient, and they are afraid of learning. Many students have a mind to learn, but in the way of learning, they lose the motivation. As a result, a vicious circle forms. Therefore, promoting learning motivation and adopting a step-by-step teaching model become two major measures to be taken urgently. In order to enhance students' interest in learning, through pre-class micro-videos, students can understand the application and significance of knowledge points in industry. In the process of students' understanding of industry knowledge, they realize that work regulations must be strictly obeyed. In the experiment or work, a miss is as good as a mile. Over time, students will be awed by the basic knowledge and operant skills, which is also the basis and prerequisite for the formation of craftsmanship spirit. Students will stimulate their internal learning motivation after they understand the application prospects of the knowledge they have learned. At the end of the micro-video, the knowledge points of the next course will be condensed into corresponding questions for students. Guiding students to complete a small task through a few simple questions may be another form, so that students can complete the preview with tasks or purposes. Due to the otherness of students, different students have different cultural foundations and they meet different problems in their study. Students send the problems to teachers through mobile app while teachers can give targeted answers in the course of teaching. Both of them can get twice the result with half the effort.

3.2 Teaching in the Classroom

In the traditional teaching model, teachers teach and students learn. This model usually leads to either a dull classroom atmosphere or a condition that lots of students play mobile phones. The SPOC model adopts the model of students' learning first, teachers' teaching later, and the classroom teaching mode is also diversified. In the SPOC model, students are selected randomly to show their results of preview on their own initiative. The types of results are diverse, such as understanding of principles, written programs, produced works and so on. Every student has the opportunity to participate in the speech, which provides students internal motivation. Besides, it also promotes students' ability of communication and cooperation. Because there are unilateral and deficient opinions in students' report inevitably, teachers can point out and correct them. As a result, the class atmosphere is enlivened and students' participation is improved.

3.3 After-Class Research

In order to enable students to apply what they have learned and master their skills, we mainly make efforts in the following three aspects.

(1) **Organize Interest Groups Related to Courses.** Excellent teachers are arranged to organize students to carry out science and technology activities and lectures

related to the curriculum, as well as to answer questions for students. The students who are capable of learning more have an opportunity to participate in teachers' teaching and research projects to promote themselves with specific problems in engineering practice. Various forms of group activities have a good effect on consolidating students' basic knowledge and practical skills.

(2) **Focus on Skill Competitions**. The skill competition is a way for students to accumulate knowledge and develop skills. It is also an important means to cultivate students' craftsman ship. Teachers should play a leading and demonstrating role in skill competitions. With the influence of teachers' diligence and skillful learning, students must study assiduously and keep on carving.

(3) **Play a Promoting Pole in School-Enterprise Cooperation.** Effective development of school-enterprise cooperation can realize a good situation of mutual benefit and win-win results. It is a typical case of the school-enterprise cooperation base of instrument research and testing established by our institute and Jiangsu Xintongda Co, Ltd. We provide offices for enterprises while enterprises organize excellent engineers to train our students during winter and summer vacation and the weekends. Students got excellent grades can directly enter the enterprise after graduation. after training, students understand that whether the instrument function is correct and reliable is directly related to the safety of drivers and the great interests of enterprises. Students also learn how to develop and test instrument meticulously, which promotes the cultivation of students' craftsman spirit, their ability to transfer knowledge, and volitional quality.

4 The Evaluation of SPOC Model for Cultivating Craftsman Spirit

In order to evaluate the cultivation of students' craftsman spirit, this paper takes the students from the computer application major of Wuhu Vocational and Technical College as the research objects, and establishes an index system to evaluate the craftsman spirit of them. We take 14 grade students as the control group and 15 grade

Table 1. The index system of evaluating craftsman spirit

Craftsman spirit	Index	Weights	Methods to evaluate
	Self-confidence	15%	Issue questionnaires
	Knowledge reserved	25%	Take average score of final exam
	Compliance with industry regulations	10%	Train students in electricians for two hours, and then experimental equipment is provided to enable them to complete relevant wiring tasks. At last, evaluate students' performance
	Vocational skills	25%	
	learning ability	25%	Introduce self-learning task in graduation design, and inspect students' learning situation in final replay

students as the sample group of SPOC teaching model. The weights and implemented methods of the index system are shown in Table 1.

Through comparative experiments, the scores of students in grade 14 are 71.26, while those in grade 15 who are implemented SPOC model are 76.18. Students in grade 15 are obviously better than those in grade 14.

5 Conclusions

The cultivation of "craftsman spirit" begins at school and is achieved at enterprises. As the main force of training high-skilled talents for the future, polytechnic colleges should integrate craftsman spirit into daily teaching. Taking basic knowledge, industry regulations, experimental teaching and skill competitions as carriers, students' "ingenuity" can be cultivated from daily life bit by bit. By adopting SPOC model and improving the construction of corresponding platforms, two shortcomings of weak foundation and insufficient learning motivation of polytechnic college students can be overcame to a certain extent. Thus, students build up confidence, acquire knowledge, obtain certain skills, and lay the foundation for entering society, after three years of colleges.

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