Exploration and Practice of "Team Style + Multiple-Phase" Double Teacher Teaching Model in Applied Universities Under the Background of New Engineering

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Abstract. New engineering emphasizes the interdisciplinary, comprehensive, and applied nature of disciplines. And the university should focus on cultivating students' practical and innovative abilities. However, there is currently some serious problems that the professors' knowledge deviating from the needs of enterprises and technology lagging behind in applied universities. These result in poor teaching quality and affecting students' employment. The construction of a double teacher team in applied universities is particularly important to eliminate the gap between talent cultivation and enterprise employment. This paper explores the ideas and goals of building a "team style + multiple-phase" double teacher teaching model, aiming to integrate high-quality resources both inside and outside the university to create a teacher team that has solid professional theoretical knowledge, rich practical experience and skills. And it adapts the phased teaching that the student can be choose the teacher team according to their interest under certain theoretical foundation conditions. This teaching model can improve teaching quality and talent cultivation level, and enhance students' practical and research abilities.

Keywords: Team Style, Multiple-phase, Double Teacher.

1 Introduction

The double teacher model has always been a focus of attention among educational scholars, and many studies have been conducted on the capacity building, path building, school enterprise cooperation, team building, and other aspects of " double teacher' teachers. Yao proposes improving the talent introduction and cultivation system to improve the training quality of " double qualified teachers"[1]. Lian Zhai suggests improving the quality of double qualified teachers from four aspects ideological guidance, training and improvement, evaluation and assessment [2]. Nursetiawati proposes to established Teacher Performance Award to improve teachers' enthusiasm[3]. Henan introduces that Haikou University of Science and Technology builds a multi-level and three-dimensional teacher training system[4]. Qi proposes that we should establish a win-win mechanism for multi-stakeholder collaboration[5]. Linjie show that it is

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beneficial for enhancing students' innovation ability to break the shackles of internal resources in schools[6].

Experts and scholars have provided specific opinions and suggestions on the construction of a double teacher teaching model. But there are still problems. The cooperation between schools and enterprises is not deep enough, and the cooperation between schools and enterprises is mainly reflected in the level of enterprise training for students, lacking enterprise training for teachers. Although it is currently encouraged for teachers to enter enterprises for secondment, the shortage of teachers in applied undergraduate programs makes it difficult for teachers to fully take off work and complete secondment, resulting in insufficient depth and duration of secondment. Moreover, the depth of involvement of enterprise mentors in student teaching is insufficient, and there is a lack of communication and cooperation with professional teachers. After classroom teaching is completed, it is difficult for students to maintain contact with corporate mentors. Therefore, this article proposes the construction of a "team style + multiple-phase " double teacher team, which promotes communication between enterprises and school teachers, and promotes deeper cooperation between schools and enterprises.

2 Construction Ideas for Teaching Model

2.1 Building the Teacher Team

Enterprise personnel, internal professional teachers, and relevant external school teachers form the teacher team to realize school-enterprise fusion and inter-institution collaboration. Enterprise teachers and relevant professional teachers form courses or professional groups, cooperate and communicate with each other, select corresponding teaching content, jointly discuss cases and assessment models, and develop relevant course outlines based on current technological development and actual needs. Enabling enterprise personnel to fully participate in various stages and processes of talent cultivation, and building a teaching team between enterprise teachers and professional teachers both inside and outside the school. Enterprise teachers bring enterprise projects and research directions into the teaching team, and under the guidance of enterprise teachers, teachers inside and outside the school can be exposed to real project cases to enhance their scientific research and project capabilities. Enterprise teachers and teachers both inside and outside the school can jointly divide projects and embed them into various stages of talent cultivation, allowing students to be exposed to actual projects of the enterprise in the knowledge learning stage, which is conducive to the development of talents and the improvement of training quality. Using actual projects as carriers, through project-based teaching, students can learn and master professional knowledge and skills in practice, while cultivating teachers' project organization and management abilities. Teachers from different enterprises and schools form more refined team groups based on research directions and interests, and teachers within the groups conduct more in-depth research. All research groups have a general leader who is responsible for the overall work of the team.

2.2 Building the Sustainability Research Team

The construction of a teacher team is relatively simple, but its long-term development is a difficult task. Therefore, it is crucial to continuously mobilize the enthusiasm of team teachers, as well as the enthusiasm and participation of enterprise teachers, to build a sustainable teacher team. At the same time, the purpose of cultivating double teacher is to improve the quality of talent cultivation. Therefore, it is feasible that students are selected to participate in the teacher team. The addition of students can also reduce the research burden on teachers and inject new ideas and vitality into the team. The team building method is shown in Fig. 1.

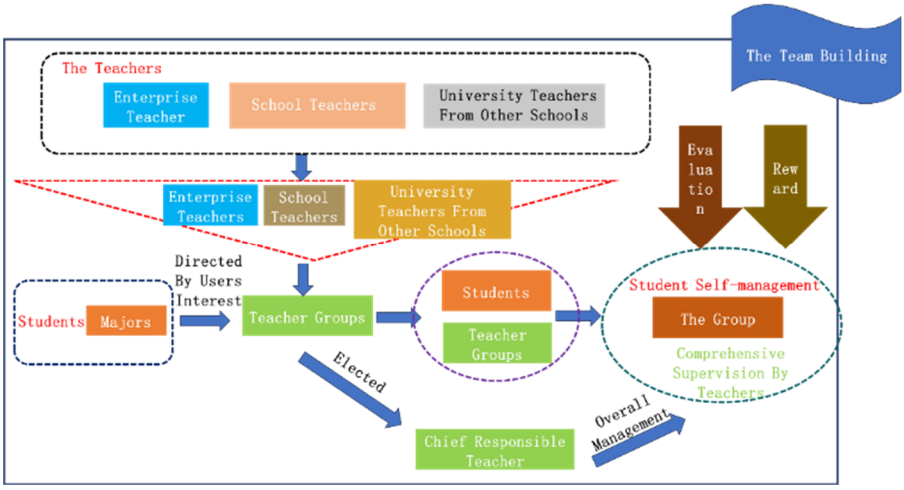

Fig. 1. Team building model diagram

We should establish a comprehensive evaluation system and reward mechanism to maintain team vitality. For example, we establish a diversified, multidimensional, and full process evaluation mechanism. Every certain period of time, an evaluation is conducted, which includes student evaluation, teacher-student mutual evaluation, and teacher-student self-evaluation. At the same time, the evaluation content includes participation, enthusiasm, contribution, achievements, and other aspects. Multiple dimensions and diverse indicators are integrated to form an evaluation. We conduct mid-term evaluations during each semester and annual evaluations at the end of the year, establish a full process evaluation system, enable teachers and students to actively participate, and comprehensively evaluate the professional competence and practical ability of double teacher teachers. The purpose of the evaluation is to reward students and teachers who have received high evaluations with material rewards. And we apply for class hour subsidies for enterprises and on campus teachers to improve their enthusiasm.

We should build a sustainability student group for research guided by student interests, with student self-management and comprehensive teacher supervision as the rules. Students can choose a teacher group based on their interests, forming a research group consisting of teachers and students. Each research group has a student leader

responsible for the group's related matters, while the guiding teacher provides overall control. Each group provides individual and free training for students, with the guidance of the supervising teacher conducting overall control under the guidance of teaching objectives. Student leaders are selected to manage group members and organize collaborative research among them.

2.3 Multiple-Phase Research

Staged teaching is divided into three stages: the theoretical stage, the practical stage, and the evaluation stage. In the theoretical stage, students are able to master the basic knowledge of the course, and are jointly explained by enterprise teachers, professional teachers on campus, and professional teachers outside the school according to the divided course content modules. In the practical stage, students are trained freely in groups based on their interests, with enterprise teachers and professional teachers from both inside and outside the school serving as group guidance teachers. Group members collaborate to explore and combine competitions and actual enterprise projects to provide personalized practical guidance to members, achieving the goal of "promoting learning through competitions", technological transformation, and improving the quality of training and employment. The evaluation stage runs through the first two stages, during which the overall evaluation is conducted at the end of the semester, including collaborative exploration, group contributions, completion of project competitions, achievements, and other forms of stage, diversified, multidimensional, and full process evaluation.

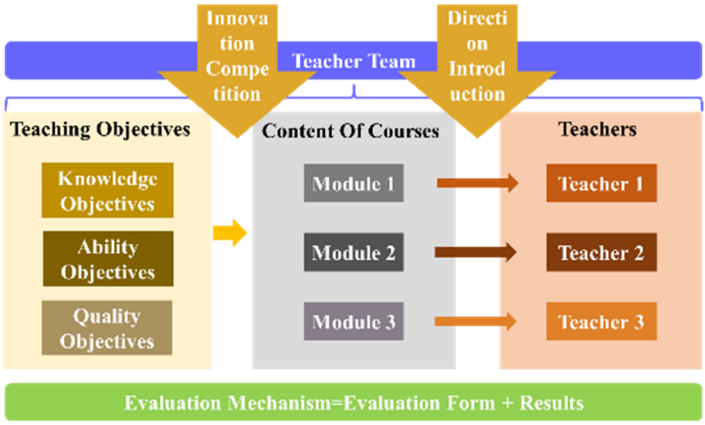

Fig. 2. The theoretical design diagram

The theoretical stage carries out a two-month theoretical unified training, in which professional teachers and enterprise teachers from both inside and outside the school jointly divide the course content into modules based on the course objectives. Different modules are explained by different teachers. During the explanation process, students can learn about different teachers' research directions, courses or professional

development directions. And students select the group to join based on mutual understanding. The evaluation stage is embedded into the theoretical stage. We add an evaluation mechanism to break away from the traditional form of testing as the main form of grades. For example, we use evaluation forms (such as collaborative exploration, group contribution, teacher guidance participation, etc.) and the completion of competition works, as well as the winning situation of works, to evaluate scores. The evaluation form should have practical basis support (such as attendance sheets, task records, etc.). Conduct periodic self-evaluation and peer evaluation every two weeks, and conduct a final evaluation at the end of the semester, forming a phased, diversified, multi-dimensional, and full process evaluation. The theoretical stage is shown in Fig. 2.

The practical stage is the main component of the multiple-phase. Its content is shown in Fig. 3. Students choose to form corresponding groups based on their interests and join the corresponding teaching team for professional practice. Each group provides individual and free training for students, with the guidance of the supervising teacher conducting overall control under the guidance of teaching objectives. Student leaders are selected to manage group members and organize collaborative research among them; Select the competitions that students can participate in based on their situation, and at the same time, divide enterprise projects and embed them into various stages of student practice, ultimately obtaining formed project results. Encourage the publication of scientific research papers or patents; Conduct weekly group discussions and workshops, and monthly class discussions where students share and exchange ideas, implementing a sharing system. We support students to join different groups and adjust group members at the same time, but it needs to be decided by the guiding teachers and the overall leader of both groups based on the students' situation through consultation. The evaluation stage is also embedded into the practical stage similar to the theory stage, including project completion and implementation status ratings.

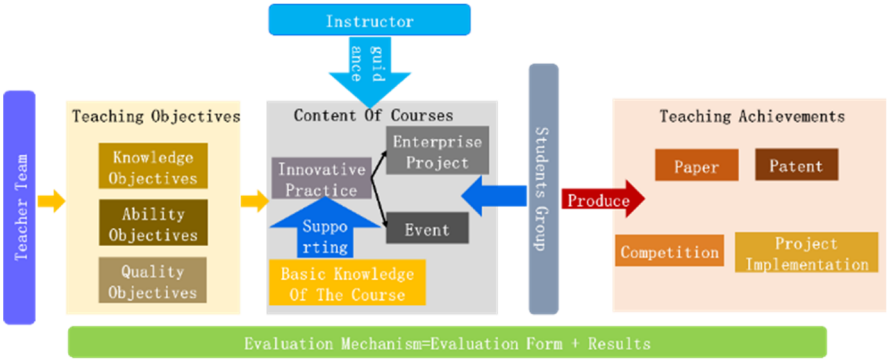

Fig. 3. The practical design diagram

3 The Goal of Teaching Model

Students can improve their knowledge structure and professional competence according to the requirements of real enterprise projects by this model. The number of winners

in student competitions has increased. They can enhance themselves in competitions, complete projects, papers, patents, and collaborative output in competitions, enhance their innovative practical abilities, and improve the quality of their employment. Through the creation of teams, schools promote communication between schools and enterprises, enhance the engineering and innovation capabilities of teachers, and are committed to economic development and industrial upgrading, achieving technological transformation, driving school development, and creating another highlight of the school; Enterprises can participate in the process of student training and cultivate reserve talents according to their own development needs.

4 Conclusion

We explore the "team style + multiple-phase " double teacher teaching model in applied universities under the background of "new engineering". The "team style + multiple-phase " double teacher teaching model includes a school-enterprise fusion and inter-institution collaboration, with enterprise teachers and external school teachers participating in the entire process. Teachers cooperate and learn from each other, reducing training costs while increasing the depth and sustainability of training; Join the mutual evaluation and self-evaluation system, evaluate from multiple aspects such as innovative practice ability, teamwork ability, and teacher teaching ability, and add class hour subsidies and rewards to continuously mobilize the participation of teachers and students. Different schools can integrate professional courses of the same major according to research directions or projects, and use this teaching model to improve students' practical abilities.

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