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Construction and Practice of Public Mathematics Practice Teaching System Based on School Enterprise Collaboration

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Abstract: Against the backdrop of deep integration between education and industry, this study focuses on exploring the construction and implementation path of a practical teaching system under the school enterprise collaborative education model, in response to the practical difficulties in public mathematics teaching. Taking into account the resource advantages and educational goals of both schools and enterprises, the system has designed a public mathematics practical teaching architecture that covers practical course modules based on enterprise needs, diversified practical teaching methods, a two-way exchange mechanism between school and enterprise teachers, linkage between on campus and off campus practical platforms, and a multidimensional teaching evaluation system. In the practical stage, real cases and projects from enterprises are introduced to drive students to apply mathematical knowledge to solve practical problems, significantly improving their mathematical application and practical innovation abilities, while enhancing their adaptability and competitiveness to enterprise positions. The empirical results show that the teaching system has achieved significant results in the collaborative practice between schools and enterprises, providing a practical example for the reform of public mathematics teaching in universities. It helps to promote the improvement of the quality of applied talent cultivation and better meet the demand for compound talents in social and economic development.

1. Introduction

In today's era, with the rapid development of technology and accelerated adjustment of industrial structure, society's requirements for higher education talents are becoming increasingly diverse and stringent. From a macro perspective, global economic integration has intensified competition in various industries. In order to stand out in the market, enterprises urgently need a large number of compound talents who not only possess solid theoretical knowledge but also excellent practical abilities. The importance of mathematical literacy and application ability cannot be overstated[1].

Focusing on the field of education, traditional public mathematics teaching has long had the drawback of "emphasizing theory over practice". In the classroom, teachers mainly focus on

teaching abstract theories, and teaching cases and exercises are not closely related to actual work and life. This results in students performing well in theoretical exams, but facing real professional problems or work scenarios, it is difficult to effectively analyze and solve them using their learned mathematical knowledge. The cultivation of practical innovation ability is also seriously inadequate, making it difficult to meet the needs of enterprise positions[2].

At the same time, the collaborative education model of school enterprise cooperation has flourished, breaking down the barriers between school education and enterprise practice, and providing new ideas and approaches for talent cultivation in universities. By integrating the advantages of both schools and enterprises in educational resources, practical platforms, industry experience, etc., more opportunities can be created for students to engage in practical projects and participate in enterprise operations, thereby effectively enhancing their comprehensive literacy and professional competitiveness[3]. Under this trend, public mathematics, as a fundamental discipline in universities, has become an inevitable choice to construct a corresponding practical teaching system. This not only helps promote the connotative development of mathematics teaching, but also is a key measure for universities to follow the trend of the times, deepen educational and teaching reforms, and achieve precise talent cultivation. It has significant importance in promoting the organic connection between the education chain, talent chain, and industry chain[4].

The research results of this study have important theoretical and practical significance for promoting the reform and innovation of the public mathematics practical teaching system under the collaborative education mode of school enterprise cooperation, and improving the quality of talent cultivation. At the same time, the research methods and results of this article can also provide reference and guidance for other universities, which has certain reference value for promoting the reform and development of higher education in China[5].

2. Analysis of the Current Situation and Problems of Public Mathematics Practice Teaching under the Collaborative Education Model of School Enterprise Cooperation

2.1. Tightness of Cooperation

At present, school enterprise cooperation has presented various forms of cooperation in the field of public mathematics practice teaching, such as enterprises providing internship bases for schools, schools inviting enterprise experts to participate in curriculum design and teaching guidance, etc. Both parties have explored and attempted resource sharing. But overall, the level of cooperation is not ideal. The cooperation between the two parties is mostly temporary and superficial, lacking long-term stable and in-depth collaborative mechanisms. For example, when companies participate in the development of teaching plans, they often only provide broad suggestions without delving into the optimization of specific teaching content and methods, resulting in a significant disconnect between public mathematics practice teaching and the actual needs of the company[6].

2.2. Teaching Practice Situation

In terms of teaching practice, some teachers have begun to try to integrate practical cases of enterprises into classroom teaching, such as combining production optimization problems of enterprises when explaining calculus, introducing market risk assessment cases in probability theory teaching, and also organizing students to participate in some simple mathematical practice projects. However, the quality and effectiveness of teaching practice still need to be improved. On the one hand, the practical teaching ability of teachers needs to be strengthened. Many teachers lack practical experience in the front line of enterprises, and in the process of case analysis and practical guidance, it is difficult to accurately connect practical problems with mathematical theories, which

cannot effectively guide students to think deeply and solve practical problems. On the other hand, there is a lack of supporting resources for teaching practice, and practical venues, equipment, and related technical support are difficult to meet teaching needs, which limits the breadth and depth of practical teaching.

2.3. Student Participation Status

The participation of students in public mathematics practice teaching varies. Some students are able to recognize the importance of practical teaching in improving their own abilities, actively participate in practical activities, and improve their mathematical application and teamwork skills through practical projects. However, a considerable number of students have low enthusiasm for participation and are more accustomed to traditional theoretical learning methods. They believe that practical teaching has little effect on improving academic performance and lack enthusiasm and investment in practical activities. This phenomenon leads to a narrow audience for practical teaching, which cannot fully play its role in cultivating students' comprehensive qualities and affects the achievement of overall teaching goals.

3. Strategies for Building a Public Mathematics Practice Teaching System under the Collaborative Education Model of School Enterprise Cooperation

3.1. Strengthen school enterprise cooperation and promote resource sharing

School enterprise cooperation is the key to building a public mathematics practical teaching system under the collaborative education model. Universities should actively establish cooperative relationships with relevant enterprises, understand their demand for mathematical talents, in order to better adjust teaching content and methods. Meanwhile, enterprises can also provide students with opportunities for internships and practical training, enabling them to apply the knowledge learned in the classroom to their actual work. To strengthen school enterprise cooperation, the following strategies can be adopted:

First, establishing a long-term stable cooperative relationship, Universities and enterprises should sign cooperation agreements to clarify the rights and obligations of both parties, ensuring the continuity and depth of cooperation.

Second, establishing a school enterprise cooperation fund, Enterprises and universities can jointly establish a fund to support the construction and development of a public mathematics practical teaching system.

Third, enterprise participation in curriculum design, Enterprises can participate in the design of public mathematics courses, propose practical cases and problems, and make the courses more in line with actual needs.

3.2. Optimize practical teaching content and improve students' application ability

The practical teaching content of public mathematics should be closely integrated with students' professional background and practical needs. During the teaching process, teachers should focus on cultivating students' abilities in mathematical modeling, data analysis, and other related areas. The specific strategy is as follows:

First, introduce practical cases into teaching, so that students can better understand mathematical concepts and methods.

Second, offering practical courses, increasing the proportion of practical courses such as mathematical modeling, data analysis, etc., to enhance students' practical operational abilities.

Third, organize practical activities, organize students to participate in various mathematics competitions and seminars, broaden their horizons, and improve their application abilities.

3.3. Reforming teaching methods to stimulate students' interest in learning

Traditional teaching methods are often led by teachers and students passively receive knowledge. To stimulate students' interest in learning, the following strategies can be adopted:

First, adopting teaching modes such as flipped classroom, students can master basic knowledge through self-study before class, and have more discussions and practices in class.

Teachers should take the following measures. Second, they should utilize information technology to assist teaching, utilizing online courses, teaching software, and other means to provide rich teaching resources and convenient learning platforms.

Third, they should encourage students to explore problems together, enhancing their initiative and cooperation in learning.

3.4. Strengthen the construction of the teaching staff and improve the quality of teaching

Teachers are the core of the construction of the public mathematics practical teaching system. In order to improve the quality of teaching, it is necessary to strengthen the construction of the teaching staff, and the specific strategies are as follows:

First, they should focus on combining introduction and training: Introducing teachers with rich practical experience while cultivating existing teachers to improve teaching level.

Second, they should strengthen teacher training: Regularly organize teachers to participate in various types of training to understand the latest teaching concepts and methods.

Third, they should establish incentive mechanism: Encourage teachers to actively participate in the construction of the public mathematics practical teaching system, and reward teachers who achieve excellent results.

3.5. Improve the evaluation system and enhance teaching effectiveness

Establishing a scientific and reasonable evaluation system is an important means to improve the effectiveness of public mathematics practice teaching. The evaluation system should focus on combining process evaluation with outcome evaluation, comprehensively reflecting students' learning situation. The specific strategy is as follows:

First, diversified evaluation methods, including classroom performance, assignments, practical projects, exams, etc., are used to comprehensively assess students' learning outcomes.

Second, they should pay attention to process evaluation, strengthen monitoring and guidance of students' learning process, and promptly identify and solve problems.

Third, they should encourage students to engage in self-evaluation and cultivate their ability for self-reflection and self-improvement.

In short, under the collaborative education model of school enterprise cooperation, building a public mathematics practical teaching system requires joint efforts from multiple parties, constantly adjusting and improving strategies. By strengthening school enterprise cooperation, optimizing practical teaching content, reforming teaching methods, strengthening the construction of teaching staff, and improving the evaluation system, it is expected to improve the teaching quality of the public mathematics practical teaching system and contribute to the cultivation of compound talents with innovative spirit and practical ability.

4. Actual case analysis

4.1. Case 1

Our school enterprise cooperation with a well-known enterprise began in 2022. This enterprise is a leading technology enterprise, involving communication, Internet, artificial intelligence, etc. In the initial stage of cooperation, both parties aim to cultivate applied talents and jointly explore the "school enterprise cooperation collaborative education" model. In this process, the construction and exploration of the public mathematics practical teaching system became a key link. The enterprise side has proposed a series of practical problems based on their own needs, requiring our school students to solve these problems in mathematical practice. For example, in the field of big data. Our school teachers design corresponding mathematical practice courses based on these issues, guiding students to apply mathematical knowledge to analyze and solve problems. The enterprise invites our school teachers to participate in our school's mathematics practical teaching. The cooperative company can not only provide practical case sharing in the classroom, but also lead students to enter the enterprise and personally experience the production environment and working atmosphere of the enterprise. In this way, students can have a more intuitive understanding of the application of mathematics in practical work, which enhances their enthusiasm and initiative in learning. In addition, our school has jointly established an "employment internship base" with enterprises to encourage students to obtain internship and employment opportunities from enterprises, further deepening the cooperation between the two parties. Through the practice of school enterprise cooperation, our school has achieved significant results in its cooperation with the enterprise. Through school enterprise cooperation, the mathematical literacy of our students has been greatly improved, and they have achieved excellent results in various mathematics competitions. At the same time, the employment rate of graduates in enterprises has been increasing year by year, and the cooperation between the two parties has been highly recognized by society.

In summary, through school enterprise cooperation and collaborative education, our school has achieved certain results in the construction and exploration of the public mathematics practical teaching system. In practical cases, we have established long-term partnerships with leading global technology companies and closely collaborated with numerous startups. These practical experiences have provided strong support for the reform of mathematics education in our school and laid a solid foundation for the future development of students.

4.2. Case 2 (Collaborative Construction of Public Mathematics Practice Teaching System)

Universities and enterprises have jointly formulated the goals, content, and implementation strategies of the public mathematics practical teaching system. The specific steps are as follows, to cultivate students' mathematical modeling ability to solve practical problems and the ability to analyze problems using mathematical methods. Teachers should consider introducing practical engineering cases into public mathematics teaching, enabling students to understand the application of mathematics in practical engineering while learning mathematical theoretical knowledge. For example, they could be introducing cases such as signal processing and optimization algorithms in higher mathematics teaching. We can organize mathematical modeling competitions, encourage students to participate in practical enterprise projects, and invite enterprise experts to give lectures. Through these measures, practical teaching is combined with theoretical teaching to enhance students' practical abilities. Through school enterprise cooperation, the public mathematics practical teaching system of this university has achieved alignment with the needs of enterprises, cultivating students' practical and innovative abilities. This model provides reference and inspiration for other universities.

A certain economic university has cooperated with multiple financial institutions to improve the quality of public mathematics teaching and cultivate students' practical skills. During the cooperation process, universities and financial institutions jointly formulated the goals, content, and implementation strategies of the public mathematics practice teaching system.

5. Conclusions

After years of exploration and practice, we have constructed and reformed the public mathematics practical teaching system based on the "school enterprise cooperation and collaborative education" model, and achieved certain results. However, in the practical process, we also discovered some problems and deeply reflected on them. This section will summarize our conclusions in this reform and provide an outlook on future development directions. Through the research on the construction and exploration of the public mathematics practical teaching system under the mode of "school enterprise cooperation and collaborative education", this article draws the following conclusions: First, the model of school enterprise cooperation and collaborative education can effectively enhance the effectiveness of public mathematics practical teaching. Through the participation of enterprises in curriculum design, practical teaching, and other aspects, public mathematics teaching can better meet industry needs and improve students' practical and application abilities. Second, Building a public mathematics practical teaching system centered on cultivating students' practical abilities, including practical teaching content, methods, and evaluation, can better meet the demand of society for high-quality applied talents. Third, Under the collaborative education model of school enterprise cooperation, the construction of a public mathematics practical teaching system requires the joint efforts of schools, enterprises, teachers, and students, and needs to be continuously improved and optimized to adapt to changes in social and economic development.

In the future, the construction and exploration of the public mathematics practical teaching system under the "school enterprise cooperation and collaborative education" mode will have the following directions: Schools should first, further deepen school enterprise cooperation, strengthen communication and cooperation between enterprises and schools, make public mathematics practical teaching more in line with industry needs, and improve students' practical and application abilities. They should second, continuously improve and practice the teaching system, explore more effective practical teaching methods and means, and enhance the quality and effectiveness of public mathematics practical teaching. They should also third, strengthen the construction of the teaching staff, improve the professional competence and practical teaching ability of teachers, in order to better promote the construction and development of the public mathematics practical teaching system. Fourth, Emphasis should be placed on the comprehensive development of students, not only in the cultivation of professional skills, but also in the cultivation of their overall quality and professional ethics, laying a solid foundation for their future career development. Educational institutions should fifth, actively explore new teaching modes and technologies, such as a combination of online and offline teaching modes, to make public mathematics practical teaching more flexible and diverse, better adapting to students' learning needs and social development changes.

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