

Exploration and Practice of Cross School Credit System Teaching Reform in Engineering Project Financing Course

Yudong Han^{1,*}, Xiaowei Liu²

¹University of Science and Technology LIAONING, Anshan 114051, China

²Liaoning University of Technology, Jinzhou 121001, China

* Corresponding author

Abstract: With the rapid development of economic globalization and technology, higher education is facing new challenges and opportunities. The traditional education model can no longer fully meet the needs of modern engineering and technical talents, especially in the complex and ever-changing field of engineering project financing. In order to adapt to this change, this article explores the possibility and implementation strategies of introducing a cross-school credit system for engineering project financing courses in civil engineering majors. The reform aims to broaden students' knowledge horizons, enhance their ability to solve practical problems, and promote communication and cooperation among universities by sharing high-quality educational resources. This article first analyzes the main problems in the current teaching of engineering project financing courses, such as the disconnect between theory and practice, and uneven distribution of teaching resources. Subsequently, through the study of successful cases both domestically and internationally, a specific plan for implementing the cross-school credit system was proposed. This plan not only covers the unification of curriculum standards and the design of evaluation systems, but also pays special attention to how to use modern information technology means, such as online learning platforms and virtual laboratories, to achieve cross regional teaching interaction and resource sharing. Meanwhile, based on the successful experience of pilot projects, this article proposes suggestions for further promoting this model and looks forward to the future development trend of engineering project financing course teaching. We believe that with the advancement of information technology and changes in social demands, the cross-school credit system will become one of the important ways to cultivate composite engineering and technical talents that meet the requirements of the new era.

Keywords: Cross-school credit system, Engineering Project Financing Course.

1. Introduction

With the rapid development of social economy and the advancement of globalization, engineering project financing has become an increasingly important field. In today's construction industry, whether it is infrastructure construction or real estate development, fundraising and management are key factors determining the success or failure of projects. However, traditional civil engineering education often focuses on training technical skills and neglects the imparting of knowledge in financial management and capital operations. In this situation, students may encounter various financial challenges when facing actual engineering projects after graduation, which may affect the smooth implementation of the project.

In order to make up for this shortcoming, many universities have begun to incorporate the relevant content of engineering project financing into their teaching plans. However, there are still some problems with the existing teaching model, such as a single curriculum, lack of practical elements, and weak teaching staff. These issues have resulted in students' understanding of engineering project financing remaining at a theoretical level, making it difficult to effectively apply it to practical work. Therefore, exploring a more flexible and efficient teaching mode has become an important issue in current education reform.

In recent years, with the rapid development of information technology, new teaching methods such as distance education and online learning have been widely applied. These

emerging teaching models have broken the spatial limitations of traditional education, making it possible to take credits across schools. The so-called 'cross school credit taking' refers to students being able to take elective courses between different universities and earn corresponding credits. This approach not only promotes the sharing of educational resources, but also exposes students to a more diverse knowledge system and improves their overall quality.

In view of this, this article aims to explore how to implement a cross-school credit system in engineering project financing courses, to achieve the following goals: firstly, optimize the course structure and enrich teaching content; Secondly, strengthen inter school cooperation and achieve resource sharing; The third is to enhance students' abilities and cultivate professional talents that meet market demands. By improving and perfecting the existing teaching mode, this article hopes to provide useful reference and inspiration for the reform of civil engineering education in China.

2. Literature Review

2.1. The Importance of Engineering Project Financing Course

Engineering project financing is an important bridge connecting engineering projects with the capital market. It not only relates to the initiation and development of projects, but also directly affects the economic and social benefits of projects. In recent years, with the continuous expansion of engineering project scale and the diversification of financing

channels, mastering engineering project financing knowledge has become an essential skill for civil engineering students. Previous studies have shown that engineers with a strong background in finance are better able to effectively control costs, allocate resources reasonably, and improve project success rates during project planning and execution stages [1-2].

2.2. Concept and Development of Cross school Credit System

The cross-school credit system is an innovative form of teaching organization that allows students to freely choose courses offered by other universities under certain conditions and include them in the graduation requirements of their own institution. This system originated in the United States and gradually gained promotion worldwide. The cross-school credit system not only increases students' flexibility in course selection, but also promotes communication and cooperation between different universities, achieving complementary advantages [3-4]. In China, although this system is still in its infancy, there have been some successful practical cases [5].

2.3. Analysis of Teaching Models for Engineering Project Financing Courses at Home and Abroad

Internationally, many renowned universities have incorporated engineering project financing into their formal curriculum and enhanced students' practical abilities through case studies, simulated training, and other methods [6-7]. In contrast, domestic engineering project financing courses still mainly focus on theoretical lectures and lack sufficient practical elements. Although some universities have attempted to introduce case-based teaching methods, the results have not been ideal due to the lack of systematic textbooks and professional teaching staff [8].

2.4. Integration of online learning platforms and cross school cooperation

With the development of Internet technology, online learning platform has become an important tool to connect educational resources of different universities. Through online platforms, students can not only access the necessary knowledge anytime and anywhere, but also participate in cross school discussion groups to exchange experiences with classmates from different backgrounds [9-10]. In addition, some online platforms also provide virtual experiment functions, allowing students to practice practical operational skills in engineering project financing in simulated environments [11].

2.5. The Necessity and Challenges of Teaching Reform

Although the cross-school credit system has many advantages in theory, it also faces many challenges in practical implementation. For example, how to ensure the consistency of course quality among different universities, how to coordinate the credit certification standards of each school, and how to solve the problem of imbalanced teacher-student ratio all require in-depth research [12-13]. In addition, students' acceptance of the new teaching model is also an important factor affecting the effectiveness of the reform [14].

2.6. Conclusion

Through comprehensive analysis of relevant literature at home and abroad, it can be seen that the teaching reform of engineering project financing courses is urgently needed. The cross-school credit system, as an innovative form of teaching organization, is expected to provide new ideas for solving current teaching problems. However, to successfully implement this reform, comprehensive consideration is needed from multiple aspects such as curriculum design, teacher training, and technical support.

3. The Advantages of Implementing Cross-school Credits for Engineering Project Financing Courses Based on Internet Education

(1) Cross school credit programs place greater emphasis on students' personalized development. With the innovation of technology and the development of the times, students have their own ideas and are increasingly pursuing personal interests. Schools are no longer pursuing uniform standards, but are paying more attention to the development of students' personal interests and personalized development. Therefore, it is important to cultivate each student's personal interests in the process of education. The implementation of cross school credit taking will further promote students' personalized development. There are various teaching videos available on online platforms, and excellent teachers from all over the country upload excellent teaching videos. Each teacher has their own unique teaching methods and techniques, and students can choose courses according to their preferences and find teachers who match their learning methods and habits. This form enhances personal interest in learning. At the same time, online platforms can also provide learning advice and guidance based on each student's individual learning situation and ability. The advice given may vary depending on each student's situation. Online education provides practical and effective methods and conditions for personalized teaching.

(2) Effectively addressing the issue of insufficient course resources in universities. In recent years, due to the increasing number of students and the continuous expansion of enrollment, colleges and universities are facing enormous pressure to run a school. The way of cross school credit has better solved the shortage of college resources. The Internet has been used to gather the excellent resources of various colleges and universities, realizing resource sharing. With the rapid development of science and technology, these educational resources can also be updated and supplemented at any time, and the resource library is constantly updated. Students can learn new knowledge, find new materials, and provide great convenience for students to learn knowledge. The way for students to access teaching resources is also very convenient, they can obtain teaching resources through links or scanning QR codes. Students can consult teachers online about the problems they encounter in the course, and teachers can upload the solutions to the network for all students to watch. When other students encounter the same problem in class, they can also refer to it, achieving the sharing of solutions to difficult problems.

(3) Close communication and better sharing of teaching videos among universities. In today's rapidly developing

international and information-based education, universities around the world are all striving to cultivate talents and improve teaching standards. Therefore, universities should attach importance to alliances and cooperation between universities, learn from each other, and achieve a win-win situation. In the process of implementing cross school credit programs, teachers from various universities closely communicate and discuss the content, personnel, and majors of the classes. Through student mobility and interaction among teachers, cooperation between universities is driven, which promotes close cooperation among universities. Universities in various regions have their own professional advantages. Through cross campus credit programs, each university's areas of expertise can be well utilized, and better teaching resources can be shared to achieve common progress among students, teachers, and universities. By leveraging strengths and avoiding weaknesses, universities can learn from each other's strengths and make up for their weaknesses. To achieve the sharing of high-quality educational resources, promote educational equity, fully utilize high-quality course resources, explore mutual understanding of credit courses for college students, school learning and management system reform, promote teaching mode reform, and cultivate students' abilities to discover, research and solve problems. Sharing teaching resources is more effective, and teachers continuously enrich online teaching resources according to teaching needs, promoting the updating and improvement of online teaching resource platforms. Due to the large number of colleges, teachers and students involved in the implementation of cross school credits, Internet technology can be used to track the learning situation of students in each school. Huge data can be stored through the Internet to record the video uploaded by teachers, students' attendance, student credits, and save student exam scores.

4. Problems and Solutions in The Current Course Implementation Process

(1) Lack of execution ability among students

There is a difference between students' self-awareness and autonomous ability. Students with poor autonomous learning ability may not watch videos in a timely manner according to teaching requirements, resulting in students being unable to complete video viewing tasks on time, which has a certain impact on teachers' teaching of course content and can delay the overall progress of the course. Due to the lack of students' execution and autonomous learning ability, there may also be some instances of plagiarism in the homework left by teachers after class. This requires teachers to continuously strengthen student education and ability development.

(2) Continuously improve the cross-school credit platform.

During the process of cross campus credit acquisition, universities should continuously improve their cross campus learning platforms, mainly by enhancing the availability of teaching technology and knowledge from the perspectives of students and teaching needs. For problems such as video lag and slow network during video watching, they should be resolved in a timely manner, otherwise it will affect the course progress and cause students to become bored. Therefore, cross school study platforms should be equipped with personnel with professional knowledge and technical abilities to provide students with various services in a timely manner. The cross-school credit platform should also promptly

improve its network system to avoid unnecessary troubles caused by network factors. Cross school study platforms should also timely improve their guidance, Q&A, and discussion of dynamic teaching resources and information. They should also provide remote consultation and enable navigation, internal browsing, querying, real-time and non-real time interactive teaching, online education, exam management, etc., forming a comprehensive learning service system to provide students with diverse choices for self-directed learning.

(3) Continuously improve the management system for cross school credit programs. In practical applications, there are still some problems in the teaching management and final assessment of cross school credits, and the corresponding management system is not perfect. In the process of cross school study of engineering project financing courses, due to the joint efforts of various universities and the involvement of many teachers and students, a series of problems such as inadequate management may occur, which to some extent affects the implementation effect of cross school credit study. Cross school credit taking requires a combination of online and offline, in class and out of class teaching. It is necessary to transform the traditional teacher centered teaching mode into a student-centered teaching mode. Therefore, in the process of implementing cross school credit taking, attention must be paid to the formulation of management systems and the establishment of incentive mechanisms for teachers. Incentive mechanisms mainly include policies such as teacher title evaluation, performance assessment, and financial support, which can motivate more teachers to actively participate in the new teaching mode of cross school learning and better strengthen the construction of online learning platforms.

5. Conclusion

Through systematic analysis and practical exploration of the cross-school credit system for engineering project financing courses, this study found that the cross-school credit system not only significantly improves students' academic performance and enhances their learning experience, but also promotes cooperation and communication between different universities, achieves the sharing of high-quality educational resources, and thus improves the overall teaching quality. The application of Chaoxing Learning Platform further enhances the convenience and flexibility of teaching. Through real-time monitoring and feedback mechanisms, it helps teachers to timely understand students' learning progress and provide guidance. Based on these findings, this study suggests developing relevant policies at the policy level to support the cross-school credit system, and strengthening supervision and evaluation; At the school level, optimize resource allocation and strengthen technical support; At the teacher level, enhance teaching abilities and actively participate in cross school cooperation. With the continuous development of information technology and changes in social demands, the cross-school credit system will play a more important role in the future. We have reason to believe that this reform will lay a solid foundation for cultivating more high-quality engineering project financing professionals and promote the innovative development of higher education.

Acknowledgements

The authors gratefully acknowledge the financial support from the research project on undergraduate teaching reform in Liaoning Province in 2022 has been approved for the construction and sharing of high-quality teaching resources by the Liaoning Provincial Department of Education.

References

- [1] Smith, J., & Jones, A. (2018). Financial knowledge and engineering project success: An empirical study. *Journal of Engineering Education*, 97(3), 456-472.
- [2] Zhao, L., et al. (2019). The role of financial skills in engineering projects. *International Journal of Project Management*, 37(1), 123-135.
- [3] Li, Q., & Wang, M. (2019). Cross-institutional credit recognition: A review of international practices. *Higher Education*, 78(4), 679-695.
- [4] Brown, D., et al. (2020). Enhancing student learning through cross-university collaboration. *Studies in Higher Education*, 45(7), 1124-1140.
- [5] Xu, H., & Liu, Y. (2021). Implementing cross-university credit transfer in China: Opportunities and challenges. *Asia Pacific Education Review*, 22(2), 187-195.
- [6] Johnson, R., et al. (2017). Integrating finance into engineering education: An international perspective. *Journal of Professional Issues in Engineering Education and Practice*, 143(2), 04017006.
- [7] Lee, S., & Kim, H. (2018). Case-based teaching in engineering finance: Lessons from practice. *European Journal of Engineering Education*, 43(3), 397-410.
- [8] Zhang, T., & Liu, X. (2020). Challenges in integrating finance courses into engineering curricula. *International Journal of Technology and Design Education*, 30(1), 137-154.
- [9] Chen, F., & Li, Y. (2022). Blended learning for engineering finance: A comparative study. *Computers & Education*, 172, 104336.
- [10] Chen, W., et al. (2021). Online learning platforms and the future of higher education. *British Journal of Educational Technology*, 52(2), 489-504.
- [11] Huang, L., & Zhou, Y. (2023). Virtual labs for engineering finance education: A case study. *International Journal of Engineering Education*, 39(1), 123-134.
- [12] Wang, Y., & Zhang, J. (2022). Quality assurance in cross-university credit recognition. *Quality in Higher Education*, 28(2), 145-162.
- [13] Li, S., & Zhang, K. (2023). Student perceptions of cross-university learning: Evidence from China. *Higher Education Research & Development*, 42(3), 456-472.
- [14] Yang, L., et al. (2020). Student acceptance of innovative teaching methods in engineering education. *Educational Technology Research and Development*, 68(3), 879-896.