

Research on the Reform of the Integrated Teaching Model of Higher Mathematics Courses and Competitions under the Background of Improving Quality and Training Excellence

Shengkun Du¹, Wei Zhang², Xiaomeng Huang³

1.Hengxing University,School of Education, Qingdao 266100, Shandong, China

2.Hengxing University,School of Education, Qingdao 266100, Shandong, China

3.Hengxing University, School of Physical Education, Qingdao 266100, Shandong, China

Abstract: With the increasing demand for quality and excellence in education, the position of higher mathematics courses in university education is particularly important. This article aims to explore the reform of integrated teaching mode in higher mathematics courses under the background of improving quality and excellence. Through literature review and case analysis, this article analyzes the current application status of integrated teaching mode in higher mathematics courses, and explores its impact on student learning effectiveness and teaching quality.

Keywords: Improve quality and enhance quality; Advanced Mathematics; Integrated teaching; Reform of teaching mode.

Fund Project:

Hengxing University School-level Teaching Reform Research Project (HXJY2023J054)

Introduction

With the improvement of education level and the continuous improvement of student quality, the reform of teaching mode in higher mathematics courses, as a fundamental discipline in university education, is particularly urgent. In the context of improving quality and excellence, traditional teaching methods can no longer fully meet the needs of students. Therefore, the integrated teaching model has emerged, attempting to improve teaching effectiveness and learning quality by integrating various teaching resources and methods.

1. The role of the integrated teaching model of higher mathematics courses and competitions under the background of improving quality and excellence

1.1 Challenges and Opportunities of Higher Mathematics Curriculum under the Background of Quality Improvement and Excellence Training

In this rapidly changing society, how to improve the quality and efficiency of education has become a key issue that education institutions at all levels must solve. In universities, pursuing teaching excellence and shaping top talents has become an urgent task. In such an environment, higher mathematics courses are the core courses that students must master, responsible for shaping their mathematical thinking and innovation skills. However, conventional mathematics subject teaching methods often fail to ignite students' learning enthusiasm and innovative spirit, making it difficult for their academic performance and teaching quality to meet pre-set high standards.^[1]

1.2 Introduction and significance of integrated course competition teaching mode

Faced with the challenges encountered in the teaching of higher mathematics courses, a new teaching model that integrates courses and competitions has emerged. The new teaching method combines courses and competitions, integrating old teaching methods with modern technological means. By packaging and integrating various teaching materials and methods, students can enjoy a more diverse learning experience and be placed in a more efficient learning place. Compared with the traditional teaching method that focuses on imparting knowledge, the new teaching method that integrates competition elements into the classroom emphasizes more on students' enthusiasm and independent learning ability. This can effectively stimulate students' learning enthusiasm and creative thinking, thereby improving teaching outcomes and learning effectiveness.

1.3 The Role and Significance of Integrated Course Competition Teaching Model in Higher Mathematics Curriculum

The integrated course competition teaching model plays an important role and significance in higher mathematics courses. Firstly, it can provide diverse teaching resources and learning methods, meet the learning needs and interests of different students, and promote their comprehensive development. Secondly, the integrated classroom competition teaching model can stimulate students' learning motivation and enthusiasm, cultivate their self-learning ability and innovative spirit. In addition, the integrated classroom competition teaching model can also promote interaction and communication between teachers and students, break the traditional teacher led teaching mode, promote two-way interaction between teaching and learning, and improve teaching effectiveness and learning quality.^[2]

2. Problems in the Integrated Teaching Model of Higher Mathematics Courses and Competitions under the Background of Improving Quality and Enhancing Excellence

2.1 Imbalance of learning resources

In the classroom practice of higher mathematics, the teaching model of integrating courses and competitions has encountered the challenge of uneven resource allocation. In some universities and regions, due to insufficient funding or inadequate hardware equipment, it is difficult for students to enjoy rich and diverse teaching materials and advanced technological assistance. This has led to a shortage of resources during their learning process, such as difficulty in accessing high-quality teaching software and incomplete experimental equipment, which in turn affects their academic performance and the teaching level of teachers.

2.2 Insufficient innovation in teaching modes

In the process of implementing a teaching method that combines curriculum and competition, there is a lack of innovative improvement in the teaching mode, which is particularly noteworthy. Some teachers are still constrained by outdated teaching methods and textbooks, and have not deeply mastered and applied the integrated teaching mode, making it difficult to significantly improve teaching results and learning effectiveness. They may be overly addicted to outdated teaching methods, but neglect innovative teaching tools and strategies that match the integrated teaching, which to some extent restricts the further improvement of teaching results.

2.3 Insufficient student learning motivation

In the blended teaching method that combines curriculum and competition, the lack of learning motivation among students is a common phenomenon. In the teaching model that integrates curriculum and competition, frequent and excessive reliance on the leading role of teachers leads to a lack of independence and initiative among students, resulting in insufficient learning motivation. They may face too many competitive challenges and feel pressure in the classroom, which will reduce their enthusiasm and interest in mathematics learning, thereby affecting their learning effectiveness and the overall quality of teaching.

2.4 Improper application of technology

In the new teaching method that combines curriculum and competition, how to correctly apply technological means is a difficult problem to be solved. Some educators overly rely on high-tech tools, but forget to pay attention to the essence of the curriculum and teaching strategies, resulting in an awkward situation where educational technology is disconnected from actual teaching. For example, they may overly rely on technological means, but forget the flexibility and customization that the classroom should have, resulting in a significant discount on educational achievements and student success.^[3]

3. Reform of Integrated Teaching Model for Higher Mathematics Courses and Competitions under the Background of Improving Quality and Training Excellence

3.1 The Concept and Characteristics of the Integrated Teaching Model of Classroom Competition

The integrated teaching model of class competition combines traditional classroom teaching with competitive learning, aiming to

stimulate students' learning interest and motivation through competitive activities, improve their learning effectiveness and teaching quality. Its main characteristics include breaking through the constraints of traditional teaching models, emphasizing students' active learning and participation; Combining competition activities to cultivate students' competitive awareness and teamwork spirit; Promote interaction and communication between teachers and students, break the traditional one-way teaching mode; The core goal is to improve students' mathematical thinking ability and problem-solving ability.

3.2 Reform Path and Practice Cases

3.2.1 Establishing Mathematics Competition Courses

In the curriculum system of higher mathematics, a mathematics competition course can be planned and included in the teaching outline for specialized teaching. The design concept of this type of course is to ignite students' love for mathematics through competitive competition of mathematics subjects, thereby improving their internal driving force for learning and actual academic performance. In universities, specialized competitive courses are set up for higher mathematics, which cover all the key areas of this discipline. At the same time, in-depth teaching is carried out in accordance with the questions and standards of mathematical competition. Teachers use various teaching methods, such as explanation, discussion, exercise, and competition simulation, to ignite students' learning enthusiasm and competitive desire, and achieve significant teaching results.

3.2.2 Introducing project-based learning

In the classroom of higher mathematics, a project-based learning and education model is adopted, allowing students to solve specific mathematical problems through group cooperation. This not only exercises their ability to unite and cooperate, but also stimulates their potential in mathematical innovation. Adopting a project-based learning approach, the aim is to guide students to apply their knowledge reserves in mathematics to solve various problems in real life, thereby improving their understanding of mathematical principles and proficiency in their application skills. The course "Mathematical Modeling", based on advanced mathematics, focuses on project-based teaching methods as its main teaching method. In the classroom teaching process, students form teams and select a specific mathematical model construction task. Based on the learned mathematical theories, they use mathematical model construction techniques to solve real-world problems. Through team collaboration and practical exploration, students not only deepen their understanding of mathematics, but also exercise their teamwork and innovation skills.

3.2.3 Provide personalized learning support

Tailored learning assistance and guidance are provided to students based on their individual learning characteristics and specific requirements. With the help of hierarchical teaching methods, targeted tutoring, and tailored teaching materials, the diverse learning requirements of students are fully met, thereby improving their learning outcomes and overall teaching level. The purpose of launching the "Tailored Mathematics Learning Guidance" course in universities is to provide students with exclusive mathematical research assistance. The teaching arrangement covers diverse levels and themes, and students can choose appropriate learning materials and methods according to their academic abilities and specific requirements. At the same time, they can enjoy corresponding tutoring and guidance. With the help of customized learning assistance, students' academic achievements and teaching quality have significantly improved.

Conclusion

In the context of pursuing quality improvement and optimization, how to combine higher mathematics courses with the spirit of competition and innovate teaching models has become a focus of attention in the education industry. This article analyzes in depth the application effect, challenges, and improvement methods of combining courses with competition in higher mathematics teaching. Facing challenges and seizing opportunities coexist, we need to continue to pursue innovation and actively engage in the reform and development of blended learning models, aiming to cultivate outstanding mathematical talent pool, help improve the overall quality of teaching, and make significant contributions. With the deepening of educational reform, the integrated teaching mode of higher mathematics classrooms will definitely encounter a more brilliant tomorrow.

References:

- [1]Hua Dingli, Ren Yuanhong. Teaching Innovation in Higher Mathematics Classrooms in Universities in the New Era [J]. Research and Practice of Innovation and Entrepreneurship Theory, 2024,7 (05): 176-178
- [2]Ma Wenhui. Reflection on the Spirit of the 20th National Congress of the Communist Party of China Entering Higher Mathematics Courses in Vocational Colleges [J]. Journal of Tianjin Vocational College Union, 2023,25 (08): 3-8
- [3]Jiang Xin. Research on the project-based teaching path of vocational network promotion courses under the integration mode of course competition [J]. Public Relations World, 2024, (04): 163-165