

Research on the Innovative Teaching Mode of College Mathematics Curriculum from the Perspective of “Strengthen Moral Education and Cultivate People”

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Abstract: This paper explores the reform direction and ideas of the innovative teaching model in teaching university mathematics from the perspective of ‘strengthening morality and cultivating people’. First of all, this paper introduces the direction of college mathematics curriculum teaching reform, emphasizing that attention should be paid to the cultivation of college students' mathematical thinking ability, comprehensive quality and social responsibility, and the accumulation of learning experience and commitment to learning also need to be valued. Secondly, from the new system and new method of ‘ideological and political education in the curriculum’, the practical method and reform of college mathematics curriculum, the integration of college mathematics teaching and aesthetic education, this paper further explores the effective path of college mathematics teaching reform. Finally, it summarizes the reform of teaching mode. This paper explores and researches the innovative teaching mode from many angles, and provides a useful reference for broadening the mechanism of innovation and education through the main channel of college mathematics teaching under the background of ‘strengthen morality and cultivating people’.

1. Introduction

Teaching quality is the cornerstone of higher education, and the teaching of college mathematics basic course is the main position to ensure the teaching quality. At present, the basic mathematics courses in colleges and universities focus on cultivating students' theoretical knowledge, logical reasoning ability, calculation ability, etc., with rigorous theory, strict logic, strict reasoning, but the education mechanism with mathematical culture, mathematical modeling, and knowledge application as penetration, value shaping and practical innovation ability as the goal needs to be further strengthened. Therefore, how can we take the university mathematics classroom as the main channel, centering on the essential issue of education, namely, ‘strengthening moral education and cultivating people’, quietly integrate into ideological and political elements, deepen teaching

reform, establish a trinity of teaching objectives of ‘knowledge impart ,ability training ,value shaping’, and fully implement the educational policy of the state? To realize the perfect transformation from ‘teaching’ to ‘education’ is of great significance for enhancing students’ feelings of home and country, establishing cultural self-confidence, and cultivating innovative talents needed by the country.

2. The Orientation of College Mathematics Curriculum Teaching Reform from the Perspective of ‘Strengthen Moral Education and Cultivate People’

The essence and significance of education lies in cultivating people. Such a person should first have good moral character and moral cultivation; have the feelings of family and country; care for society; and be positive. Secondly, he should have solid subject knowledge and be able to flexibly apply what he has learned to solve the practical problems. In addition, he should have critical thinking, innovation, teamwork and communication skills to adapt to the increasingly complex social environment.

The increasingly fierce international competition and the surging tide of The Times and social development have put forward higher requirements for the comprehensive quality of citizens and talent training. However, there are still some gaps in college mathematics education in the implementation of ‘moral education first, ability first, and all-round development’, and teaching and education cannot be effectively combined, which indicates that our education and teaching methods or teaching means lack innovation, and teaching effects are not up to standard^[1]. Therefore, based on the educational concept of ‘ strengthen moral education and cultivate people ’, the teaching reform of college mathematics curriculum should focus on the cultivation of students' mathematical thinking ability, learning experience and learning input, and the cultivation of students' comprehensive quality and social responsibility^[2-6].

3. The Exploration of College Mathematics Curriculum Teaching Reform Path from the Perspective of ‘Moral Cultivation’

In order to cultivate high-quality and innovative talents, college mathematics curriculum should take ‘ strengthen moral education and cultivate people ’ as the fundamental starting point, take mathematics knowledge as the carrier, closely combine ideological and political education with curriculum content, actively carry out curriculum practice activities, formulate talent training goals of ‘knowledge + ability + value’, improve students' ideological and moral quality and practical innovation ability, and cultivate high quality composite talents, and thus open up an effective path for the reform of college mathematics.

3.1 Focus on one main line, we should take classroom teaching as the main channel, deepen teaching reform, and build a new system and method of ‘curriculum ideology and politics’

Curriculum ideology and politics should not only carry out macroscopic teaching system construction and platform construction, but also pay attention to ‘integration of knowledge and action’ and carry out detailed classroom teaching construction^[7-9]. Curriculum thought and politics is the core of talent training. The organic combination of ideological and political education and teaching content aims to form the subject force of the curriculum group for students' "moral education"^[3]. The following points should be achieved: ① The connotation of ‘curriculum thought and politics’ is clarified; ② A new system of ‘curriculum ideology and politics’ is constructed, and it is necessary to design the curriculum as a whole; ③ A diversified, whole-process evaluation system to evaluate students' comprehensive quality comprehensively and objectively is

established^[10](See Fig 1.); ④It is necessary to strengthen the construction of the teaching staff, strengthen the construction of the education team with a wide aperture, seize the key strength, train the ideological and political backbone team, and realize the integration of all-round paths.

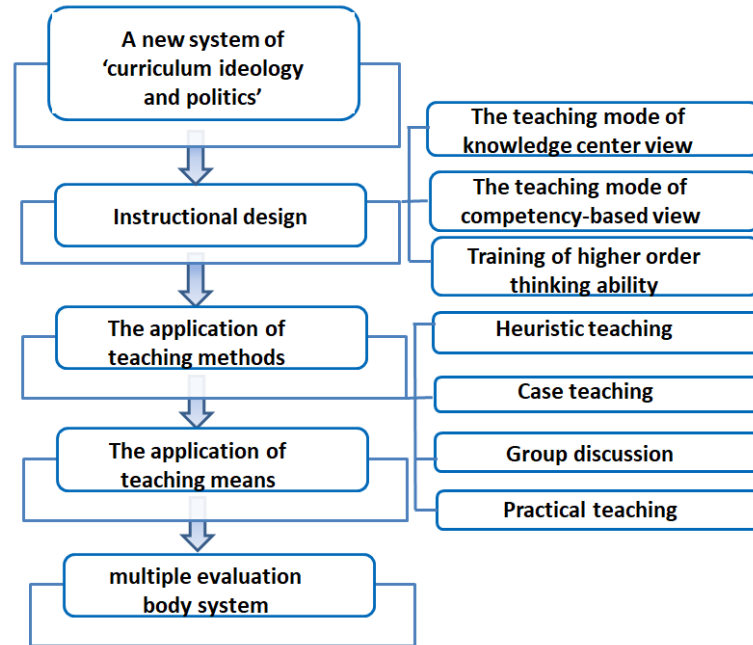


Fig 1. The construction of a new system of 'curriculum ideology and politics'

3.2 Online and offline teaching platforms are built, teaching methods are enriched, improve teaching mechanisms are improved, and curriculum practice activities are carried out

The deep integration of theory and practice can cultivate students' mathematical thinking ability, creativity, innovation consciousness, and teamwork and communication ability. This requires the teaching team to actively promote the 'online + offline' mixed teaching mode, combine the professional background, carry out offline teaching activities featuring 'case teaching, problem-driven, flipped classroom', etc., and formulate the trinity training goal of 'knowledge + ability + value' ^[11-12]. The introduction of mathematical modeling ideas and methods should be emphasized, students' mathematical thinking and modeling ability should be fully cultivated, and theoretical teaching and practical teaching should be deeply combined.(See Fig 2.)

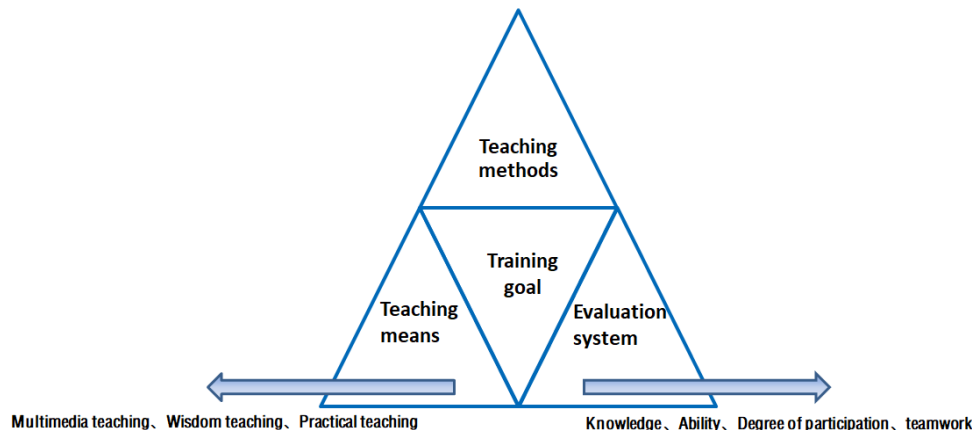


Fig 2. The establishment of teaching mechanism

To achieve these goals, various approaches should be taken^[13].

① Creating a multi-dimensional mixed teaching model, highlighting the principal position of students in teaching, and actively promoting the teaching concept of ‘taking theoretical knowledge as the main line and applying practice as the expansion’. At the same time, a process assessment mechanism is carried out, and a multi-dimensional blended teaching model of ‘teacher + student’, ‘online + offline’, ‘theory + practice’, ‘science + literacy’ is established.

② The idea of mathematical modeling should be organically integrated with college mathematics teaching to cultivate students' innovative ability. For example, when explaining the proof of some important theorems, the idea of mathematical modeling and specific cases can be introduced to concretize and clarify the complicated content. When explaining problems such as finding curve tangent line, instantaneous velocity of variable motion, trapezoid area of curved edge and maximum profit, it can also be taught with the idea of modeling in connection with practice^[14].

3.3 Three goals should be established, the educational mechanism should be broadened, and the aesthetic education and intellectual education should be carried out simultaneously

The talent training goal of ‘knowledge + ability + value’ should be established, the students should be trained to establish correct values in the teaching process of knowledge education. This requires teachers to tell mathematical stories well, promote mathematical culture, inherit mathematical thoughts, carry forward mathematical spirit, inspire mathematical thinking, and explore diversified curriculum reform models in the course teaching and practice activities of college mathematics. The principle of ‘educating people with beauty’ needs to be truly implemented.

① Clarify the important significance of aesthetic education for ‘moral education and cultivating people’. Aesthetic education is an important content of the State's educational policy and an important way to carry out the fundamental task of cultivating morality and people. College mathematics courses should not only cultivate students' ability of calculation, reasoning and argumentation, but also guide students to discover and explore ‘beauty’ from mathematics. From the perspective of pedagogy, aesthetic education must realize the cultivation of certain human abilities, which also determines that it is an indispensable aspect of implementing the comprehensive development education of college students and realizing the improvement of comprehensive literacy^[15].

② The mathematical aesthetic education should be developed vigorously, and also mathematical culture and explore the beauty of mathematics should be promoted. For higher education, the implementation of aesthetic education has two forms, namely independent form and infiltration form^[5]. In the permeating form of aesthetic education, it is necessary for teachers to guide students to understand the beauty of symmetry, simplicity and singularity of mathematics through case teaching, heuristic teaching and discussion teaching. In addition, it is also possible to carry out aesthetic education in college mathematics through extra-curricular activities mainly focusing on aesthetic education. For example, mathematical culture can be popularized by setting up the general course of Mathematical Culture, ‘Mathematics science popularization Reading Week’ and other activities can be carried out to promote mathematics science popularization, and the connotation of mathematics culture can be excavated through holding lectures and reports. Even the mathematical knowledge can be combined with vivid and diverse stage art to explore the beauty of mathematics.

Centering on the above teaching reform path, we take ‘cultivating morality and cultivating people’ as the fundamental starting point of teaching, and establish the indicators of teaching evaluation system at all levels, as shown in Table 1.

Table 1. Teaching evaluation system

Teaching elements	Primary index	Secondary index	Three-level index
Teaching Design	Teaching Objectives	Knowledge Objective	Strengthen of professional knowledge
		Capability Objective	Strengthen the ability of practice and innovation
		Value Goal	The promotion of professional quality and the infiltration of national feelings
	Teaching Contents	Knowledge Points	Teaching of concepts, theorems and formulas
		Ideological and Political Resources	The construction of ideological and political cases base and the addition of ideological and political education elements
Teaching process	Teaching Methods	Method Diversity	The use of heuristic, case and discussion teaching methods
		Methodological Heuristic	Inspiration before class and summary after class
	Teaching Practice	Practical Teaching Activities	The degree of participation and achievement of practical activities
		Practical Homework	Practical work completion degree
teaching evaluation	Achievement Evaluation	knowledge Evaluation	Evaluation of student test scores
		capability Evaluation	Evaluation of students' ability to solve practical problems
		Value Evaluation	Evaluation of students' feelings of home and country and cultural self-confidence
	Teaching Evaluation	Professional Teaching Effect	Students' mastery of basic concepts and basic theories as well as the improvement of application ability and practical operation ability
		Ideological and Political Education results	The formation and cognitive attitude of students' feelings of home and country, career ideal and innovation consciousness

4. Conclusion

In a word, it is imperative to explore and study the reform mode of college mathematics teaching based on ‘cultivating morality’. First of all, we need to focus on the training goal of innovative and composite talents, take ‘moral cultivation’ as the main line, set up the trinity teaching goal of ‘knowledge transfer + ability training + value shaping’, fully implement the educational policy of ‘three comprehensive education and five education simultaneously’, and clarify the direction and positioning of teaching reform. Secondly, we need to actively explore the reform path of college mathematics curriculum teaching, build a new system and method of ‘curriculum thinking and politics’, establish a multi-dimensional mixed teaching mode, always implement the educational concept of ‘student-centered, results-oriented and continuous improvement’, organically integrate mathematical modeling thought with college mathematics curriculum teaching, and vigorously carry out the aesthetic education of college mathematics. We should be committed to promote the culture of mathematics, explore the beauty of mathematics, and explore the diversified curriculum reform mode of ‘mathematics +’. Only by carrying out the innovative teaching reform and practice of college mathematics curriculum in an all-round way can we really broaden the education mechanism, comprehensively improve the education level, and realize the strategy of strengthening the country with talents.

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