

# Investigation of Student Evaluation Reform in “Advanced Mathematics” Course Based on Course Ideological and Political Education

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**Abstract:** Under the background of the new engineering education, educational evaluation should be multifaceted. Students are the subjects of education, and student evaluation is not only the basic link but also a crucial aspect of educational evaluation. Reforms are needed in evaluating students' learning of advanced mathematics, moving away from the practice of hero-worshipping high scores and the “lay-flat” style of learning where meeting the minimum standard is the only goal. This paper aims to explore how to reform student evaluation in the advanced mathematics course within the framework of course ideological and political education, in order to better cultivate students' comprehensive quality and innovation ability.

**Keywords:** Course ideological and political education; Advanced mathematics; Educational evaluation; Student evaluation; Reform exploration

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Based on the actual situation of our university, it is urgent to actively promote the construction of new engineering disciplines and accelerate the training of talents that meet the requirements of the times. Under the background of the new engineering education, higher education is a comprehensive education system that combines engineering technology and scientific knowledge. Higher education no longer only needs to focus on the imparting of theoretical knowledge but also needs to pay more attention to the cultivation of students' practical, innovative, and teamwork abilities. As China is promoting innovation-driven development and urgently needs innovative talents, especially in the field of new engineering disciplines, it is crucial to explore how to cultivate composite talents, a concerning issue for all universities, especially those that focus on engineering<sup>[1]</sup>.

In all learning courses of economics, management, science, and engineering in universities, “Advanced Mathematics” is a compulsory common course for freshmen and a foundation for senior professional courses. It plays an irreplaceable role in students' subsequent professional learning and has great significance for students to excel in advanced mathematics. As a university specializing in science and engineering, advanced mathematics is even more important—serving as the cornerstone for students to excel in other courses and as an important part of cultivating and improving students' logical thinking and reasoning abilities. How to integrate the characteristics of advanced mathematics courses with the goals of cultivating innovative talents in universities under the background of new engineering education, build a supporting teaching resource system, and improve teaching effectiveness, thus providing strong support for the cultivation of composite talents in new engineering disciplines, is a problem that mathematics teachers in universities should actively explore and solve<sup>[2]</sup>.

## 1. The importance of ideological and political education in higher education

The ideological and political education in higher education plays an important role in cultivating students' overall quality and

their moral and ideological character. Firstly, by integrating ideological and political content into the curriculum, it can help students to establish the correct world view, outlook on life, and values, enhance students' moral and ideological character, and cultivate students' core socialist values. Secondly, ideological and political education can broaden students' knowledge and improve their comprehensive quality by guiding students' attention to national events, social hot topics, and cultural traditions, laying the foundation for students' all-round development. Furthermore, through ideological and political education, students can be guided to reflect on national, social, and personal responsibilities, stimulating their sense of identification and responsibility towards the country and society, and nurturing their social responsibilities. Finally, ideological and political education can help students to understand and cope with difficulties and challenges correctly.

## **2. The Ideological and Political Education in Advanced Mathematics Courses**

Mathematics, as a fundamental course in engineering majors, plays a significant role in the new engineering disciplines. The teaching methods, content, and problem-solving methods used in advanced mathematics courses are crucial to the cultivation of students' creativity, reasoning abilities, and other essential skills.

The ideological and political elements in "Advanced Mathematics" can be distilled from the following aspects: First, in the teaching of advanced mathematics, the achievements of mathematicians can be introduced to promote students' recognition and understanding of patriotism, inspiring students to love their country, contribute to its development, and promote patriotic spirits. Secondly, in teaching advanced mathematics, case studies and practical problem-solving methods can be used to cultivate students' concern and sense of responsibility towards social issues, motivating them to actively participate in social affairs, contribute to social development, and nurture students' social responsibility. For instance, important limit formulas in advanced mathematics can be related to real-life cases and interesting connections can be made with ancient Chinese poetry, subtly infusing ideological and political elements into the subject and enhancing students' understanding and application of important mathematical formulas. Thirdly, guiding students in rational thinking, practical innovation, and cultivating correct outlooks on life and values in the teaching of advanced mathematics can help shape students' correct direction in life and value orientation.

## **3. The Necessity of Educational Evaluation Reform**

Traditional educational evaluation primarily focuses on students' grades and rankings, which has significant limitations in terms of students' overall development. As society undergoes development and change, the educational context shifts, and students' exposure to diverse experiences evolves. The development of students' comprehensive qualities cannot be solely measured by scores, as the "knowledge" required by students is also constantly adjusting. Moreover, the knowledge sought after by students extends beyond textbook content to encompass a wide range of subjects. This is particularly true for university students, as they are on the verge of entering society, engaging in work, and facing not only books and teachers, but also diverse social situations.

Therefore, evaluating students' education should not be solely based on grades. There is a need to comprehensively evaluate students' abilities, qualities, and potential, aligning educational evaluation with the societal needs for talent. Reforming educational evaluation can stimulate teachers to pay more attention to improving teaching methods and processes, enhancing the quality of education. Moreover, it is also an important measure to drive educational reform and development, and it plays a positive role in improving educational quality, promoting students' comprehensive development, stimulating learning motivation, and enhancing educational equity.

## **4. The Necessity of Reforming Student Evaluation in Advanced Mathematics**

Advanced mathematics is an abstract and rigorous discipline, encompassing many abstract concepts and theories. It demands strong logical and reasoning abilities from students, requiring them to understand proof processes and engage in independent thinking. The traditional evaluation method for students in advanced mathematics courses is based solely on exam scores, resulting in students' attention being solely focused on how to solve problems. This keeps students learning university-level mathematics in the same manner as they did high school mathematics. The traditional evaluation method excessively emphasizes students' mastery of mathematical knowledge while neglecting the cultivation of their innovative, collaborative, and practical capabilities, as well as other comprehensive qualities.

In addition, due to the diverse backgrounds and foundations of students from all over the country, some students lack interest and autonomy when studying advanced mathematics, causing many to aim for passing grades rather than high scores. This has led to a particularly low level of enthusiasm among students for studying mathematics.

The traditional evaluation methods for mathematics courses may no longer be suitable for the needs of modern society. Therefore, reforming the student evaluation system for advanced mathematics courses is urgently needed.

## 5. Reform Strategies for Evaluating Higher Mathematics Students

The evaluation of students needs to pay more attention to their comprehensive abilities and to cultivate their overall qualities. Each student has different characteristics and interests in the study of mathematics, so the evaluation methods should be more personalized and differentiated to better meet the individual needs of the students. Reforming educational evaluation can better stimulate students' interest in learning through diversified evaluation methods.

Reforming the evaluation of higher mathematics students needs to consider the characteristics of the subject and the needs of the students comprehensively. The following aspects should be considered:

### 5.1 Diversified assessment methods

In addition to traditional exam evaluations, methods such as class participation, homework quality, group projects, and academic competitions should be incorporated to comprehensively assess students' abilities and levels.

### 5.2 Practical assessment

Encourage students to complete practical projects to assess their understanding and application of mathematical theories in practical applications, such as calculus applications in physics, engineering, and economics.

### 5.3 Process evaluation

Emphasize students' active efforts and independent learning during the learning process, such as participation in discussions, asking questions, and solving challenging problems, rather than just focusing on results and scores.

### 5.4 Personalized assessment

Value the individual differences of students and use methods such as learning records, learning plans, and personal goals to assess and better meet the individual development needs of students.

### 5.5 Feedback mechanism

Provide timely feedback to students to help them understand their learning status and areas needing improvement, and stimulate their initiative.

### 5.6 Encourage innovation

Introduce innovative evaluation methods to encourage students to propose new problems, solutions, and ideas for which bonuses or special innovation rewards can be granted during the evaluation process.

A diversified evaluation system can enhance students' motivation and subjective initiative in learning and comprehensively assess their overall qualities, laying a solid foundation for cultivating high-quality talents for the new era.

## 6. Conclusion

In the context of the new engineering education, higher education aims to cultivate engineering and technical talents with innovative spirit and practical abilities, in order to meet the constantly evolving social needs and the challenges of technological progress. To cultivate composite talents in the new era, educational institutions need to implement multidimensional education evaluations for students, so that students clearly understand that university learning is different from secondary school learning, and they should not focus solely on their academic performance and exam scores, as university is not merely about scores. This helps students to have a clearer understanding of the university curriculum and their learning achievements across various aspects, enabling them to identify which areas they need to improve upon. Students will understand that these abilities will have a positive impact on their future development.

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