

Application of Microlecture in Advanced Mathematics Teaching

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ABSTRACT

This study focuses on the application of microlecture in advanced mathematics teaching. Through a questionnaire survey of nearly 600 first-year students in 4 universities in Tianjin, it is found that the integration of microlecture in advanced mathematics teaching can enhance students' interest in learning and can cultivate students' ability to analyze and solve problems and thus improves the efficiency of classroom teaching. However, microlectures still have its problems in the teaching of advanced mathematics, such as a large amount of time in microlecture preparation, the over emphasis on presentation form rather than teaching content, the excessive pursuit of visualization and dynamics rather than teaching itself. To make continuous improvement through teaching practice and serve the teaching process better, teachers should check, evaluate and record teaching procedures according to the advantages and disadvantages of each microlecture teaching.

Keywords: microlecture; advanced mathematics; teaching mode; questionnaire survey

1. INTRODUCTION

With the development of internet information technology, people's lifestyles and learning methods have undergone great changes[1]. Internet information technology mainly involves integrating internet information technology into the whole process of higher education, and gradually changes the original teaching ideas and modes. In order to study the application of microlecture in advanced mathematics teaching, we carried out a questionnaire survey which shows that microlecture is of great significance in advanced mathematics teaching and students are quite in favor of it, but there are still problems need to be solved. The result of the survey provides an important practical basis for us to further improve the integration of microlecture into advanced mathematics teaching[2].

2. THE CONTENT AND RESULT ANALYSIS OF THE QUESTIONNAIRE SURVEY

The survey was distributed to 600 freshmen of 4 universities in Tianjin with 578 returns, of which 8 were invalid questionnaires. So the rate of return is 96.3% and the effective rate is 95%. This questionnaire involves six questions: how's students' understanding of microlecture; what is students' favored length of microlecture; what is students' positioning of microlecture; what attracts students most about microlecture; which aspect of microlecture application is more attractive to students, and what is students' demand for microlecture.

1. How's students' understanding of microlecture? Students' understanding of the microlecture varies with 8% of students totally understand it, 41.7% quite understand it, 28.7% generally understand it and 22% do not understand it. Even though microlecture is a new thing, the students can highly understand it through the Internet. With more than half of the students know the definition and use of microlecture, as is shown in the survey. The popularity of microlecture among students is an important guarantee for us to integrate microlecture into teaching.

2. What is the most acceptable length of microlecture for students? The most acceptable length by 15.2% of students is 5 minutes, by 52.2% of students is 5-10 minutes, by 26.1% is 10-30 minutes, by 6.5% is 30 minutes or more. From the above data, most students still have their own preference of the length of microlecture: within 10 minutes, only a few students due to the lack of understanding of microlecture, chose longer learning time, that is, 30 minutes or more.

3. What is students' positioning of microlecture? 26% of students believe that microlecture is a way of classroom teaching, 15.2% think microlecture is an extension of classroom teaching, and 58.7% think both. From the data obtained, many students don't know much about the positioning of microlecture. The role of microlecture is to "solve confusion" rather than "giving instruction", which even though can be carried out online regardless of time and space it can't replace traditional classroom teaching.

4. What does microlecture attract students most? 36.2% of the students are attracted because of the short time, 42.3% likes the video form, 89.1% thinks that the knowledge is centralized and targeted, and 4.3% thinks it is very cool. From the data analysis, most students prefer a short time, the video form and the targeted knowledge. That means

microlecture are well-accepted by most students, and some students even think that the microlecture is something cool and stylish.

5. Which aspect of microlecture application is more attractive to students? The results of the survey are as follows: 51% of the students choose the introduction of the new lesson, 56.5% choose the core concept, 65.2% choose new lecture explanation, and 56.5% choose curriculum summary and expansion. From the statistical results, there is an even distribution of the four items with the most students chose two to four items, and only a small number of 10% students chose only one.

6. What is students' demand for microlecture? 46% of students prefer more animations, 51% prefer picture insertion, and 31% prefer more practice. From the statistical results, most students are more accustomed to using visual animation or picture form to learn new knowledge.

3. CHARACTERISTICS OF MICROLECTURE

Microlecture is mainly to highlight the teaching of targeted knowledge points in classroom teaching, and consists of a series of teaching and learning activities that reflect a certain teaching link and teaching theme in the classroom. The core content is teaching video, which forms a theme teaching resource integrating teaching design, multimedia materials and courseware. The characteristics of microlecture are as follows:

1. Short teaching time. Microlecture usually takes 5-10 minutes to complete the teaching of a certain knowledge point, and the teaching activity time is short. Compared with the traditional teaching of 40 or 45 minutes for each lecture, microlecture teaching conforms to the cognitive characteristics and learning rules of learners, which is conducive to improving learning efficiency. As a new teaching mode, it meets the requirements of information and communication technology revolution for learners to a great extent.

2. Small teaching theme. Compared with the broader traditional teaching classroom, the teaching theme of the microlecture is short, the goal is clear, and the theme is prominent. In terms of size, the total capacity of microlecture and supporting auxiliary resources is generally around tens of megabytes. The video format must be a media format that supports online playback which provides teachers and students an easy way to smoothly observe online teaching, view auxiliary resources such as lesson plans and courseware. It can also be flexibly and conveniently downloaded and saved on the terminal device to realize mobile learning, which is very suitable for teachers to do observation, evaluation, reflection and research.

3. Precise teaching content. In terms of teaching content, it is highly targeted, focusing only on a certain knowledge point or a teaching link. Teaching design can be precisely controlled, therefore the essence of the teaching content

can be shown in a short time course. In the course of teaching, teachers adopt problem-led and task-driven teaching strategies to make the classroom form vivid and engaging.

4. Delicate teaching design. In a limited time and space, the teaching design of the microlecture is novel, perfect in thought and accurate in language. Because of its exquisite design, it is vividly explained so that teachers can clearly understand its design and students find it impressive so as to achieve the purpose of mastering related knowledge points. Microlectures are easy to spread because of their short and delicate features. On the one hand, it serves as an auxiliary resource for teachers' classroom teaching, and on the other hand, it serves as a material for students to study before and after class.

4. THE IMPORTANCE OF INTEGRATING MICROLECTURE INTO ADVANCED MATHEMATICS TEACHING

1. Microlecture can restructure the relationship between teachers and students. In advanced mathematics teaching, PPT, micro video and other media will be integrated together to make students, teachers and teaching materials reconstructed[3]. Teachers are both the organizers and the participants of the microlecture. Such interactions between teachers and students have greatly enhanced students' autonomy in knowledge inquiry. Under such relaxed learning conditions, students are free to speak, and they are both the learners and creators of classroom learning.

2. The deep integration of microlecture and advanced mathematics teaching is conducive to students' understanding of abstract concepts, theorems and formulas, and thus it can enhance students' interest in learning. Microlecture can make the abstract and boring learning content evident and easy to understand through graphics, animation and other forms of expression. For example, the concepts of definite integrals, double integrals and line and surface integrals are hard nuts for students to crack in advanced mathematics, because they are all defined by an abstract complex limit. In this case, teachers can use power point with its powerful micro-video animation demonstration function, to show the integral definition of "arbitrary segmentation, freely choose" to students, thus it can facilitate students' understanding of the essence of "segmentation, approximation, summation and limit-taking", which is a good method to offer students an evident and profound understanding of abstract concepts by making abstract concepts more concrete and vivid.

3. Microlecture can cultivate students' ability to analyze and solve problems. PPT, micro video and other media combined to provide students with a new teaching scenario, allowing students to contact specific real situational data in the process of repeated analysis and decision making. According to the existing knowledge, we can conclude that students are not imitating and remembering, because the instruction given by the teaching video is very concise in

the whole learning process. Students must solve various problems through thinking and using different methods[4].

4. The deep integration of microlecture and advanced mathematics teaching can increase the information of classroom teaching and improve the efficiency of classroom teaching. Using micro video media for teaching, teachers only need to demonstrate the pre-prepared micro-video courseware in class, which saves teachers' time to write on the blackboard, thus increasing the information of teaching and improving teaching efficiency.

5. Improve students' ability of mathematical reflection and communication. For video recording, students can evaluate teachers, which is different from traditional classroom teaching where students are embarrassed to evaluate teachers in the presence of them, while when facing their teachers in video, students can put forward their own ideas. This helps teachers find problems in teaching. It can also improve students' ability of mathematical reflection. By commenting on others' speeches and answering others' questions, it can also encourage students to constantly reflect on their mathematical answers. During the discussion, students learned not only to use mathematical language to communicate with others, but also to learn mathematical communication skills with others.

5. THE EXISTING PROBLEMS

Microlecture is a new thing for college students and teachers[5]. According to the above questionnaire analysis, students are not exclusive to microlecture and are willing to accept and use this new teaching mode. However, there are still some problems in microlectures, such as the less effective use and unbalanced content of microlecture. Therefore, we should improve from the following aspects: enrich the form of microlecture, appropriately use animation and picture contents, stimulate students' interest in learning, further increase the synchronous exercises and after-school exercises, consolidate the classroom teaching effect, make the microlecture meticulous and professional, and guide students to know how to make effective use of microlecture, so that students can really walk into the micro classroom[6].

Although the integration of microlecture and advanced mathematics teaching is a new mode, it is welcomed by students. But there are still many problems as follows:

1. Advanced mathematics is less suitable for microlecture teaching.
2. Teachers spend too much time preparing micro-videos, resulting in inefficient preparation.
3. The form of microlecture is over emphasized than the content, thus shifting learners' attention from the learning content to the form of presentation, which not only deviates the learning activity from the learning goals, but also results in students' thinking inertia. This negatively affects the cultivation of students.
4. Too much focuses are put on the visual, dynamic and leisure aspects of microlectures. Microlectures now tend to be overwhelmed with gorgeous pictures, dashing flashes and popular music, which satisfy the sensual pleasure but

diverge from the original intention. So as for the integration of microlecture in advanced mathematics teaching, more attempts and discussions are in great need. In short, in order to integrate the microlecture into the teaching of advanced mathematics, we should control the progress of the class flexibly and make teachers and students communicate effectively. We should pay attention to the expression of language, which should be enlightening and appealing, so that students can understand and get impressed. In the process of teaching, teachers should pay attention to the changes of students' emotions, be good at finding problems in teaching according to the changes of students' emotions, and adjust teaching methods in time.

6. COUNTERMEASURES

1. In terms of teaching preparation, teachers should make micro-videos suitable for students according to their characteristics to stimulate students' interest in learning.
2. In the process of teaching implementation, teachers can mobilize students' learning initiative by grouping, discussing and summarizing this process.
3. To make continuous improvement through teaching practice and serve the teaching process better, teachers should check, evaluate and record teaching procedures according to the advantages and disadvantages of each microlecture teaching.

7. CONCLUSION

Through a questionnaire survey, it is found that the integration of microlecture in advanced mathematics teaching can enhance students' interest in learning. However, microlectures still have its own problems in the teaching of advanced mathematics. To make continuous improvement through microlecture teaching and serve the teaching process better, teachers should check, evaluate and record teaching procedures according to the advantages and disadvantages of each microlecture teaching.

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