

Research on the Mixed Teaching Mode based on the New Form Textbook of Linear Algebra

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Abstract: The new form of textbooks combines paper textbooks with new media resources, teaching with modern technology, and compensates for the content that paper textbooks cannot carry. The new form teaching materials of Linear algebra, including the integrated design of teaching content, strengthen the problem orientation, fully reflect the concepts of Flipped classroom, mixed teaching mode, inquiry learning, etc., improve the creativity, progressiveness and effectiveness of college mathematics teaching activities, and promote the benign development of college mathematics teaching.

Keywords: New Form Textbooks; Mixed Teaching Mode; Linear Algebra.

1. Introduction

In the new era, information technology closely combines the Internet with existing industries, creating a new form of academic research. Textbooks, as an important carrier for teachers to organize teaching activities and students to carry out learning activities, are the basic basis for achieving teaching objectives. Its content should be classic and comprehensive, and its resources should be contemporary and progressiveness. With the deep integration of modern information technology and internet thinking in teaching, a new form of textbook integrating paper content and digital resources has gradually emerged.

Linear algebra is a required course for many professional students in university study. Due to its strong abstraction and complexity, with the advancement of the teaching process, problems such as students' learning interest and motivation level decreasing, separation of theory and practice, etc., often occur, affecting the teaching quality. The new form of textbooks comprehensively utilizes multiple factors such as tradition and modernity, classroom and network, offline and online, teaching and learning, theoretical systems and practical platforms, etc., transforming closed, one-way, and indoctrinated traditional teaching into open, interactive, and intelligent teaching. The construction of Linear algebra new form textbooks in the new era is not only the need of the development of the information age, but also the need of the reform of teaching methods.

2. New Forms of Textbooks Promote Blended Teaching Models

In the context of the new era, online classrooms have begun to span time and space in online teaching. The traditional Morphogenesis of teaching has changed significantly, showing the rich media of teaching environment, the diversification of teaching resources, and the intellectualization of teaching methods. Teaching resources are no longer limited to traditional classroom environments. A blackboard and a multimedia classroom that can play PPTs clearly cannot meet the requirements of the new teaching form.

2.1. The New Teaching Environment under New Media

Under new media, animation, sound, video, and interactive information are spreading various educational resources. Rich Media itself is not a specific form of internet media, but rather refers to information dissemination methods with animation, sound, video, or interactivity. It includes one or several forms of programming languages such as streaming media, sound, Flash, and Java, Javascript, DHTML, and can be widely used in various network services and teaching platforms. Platforms such as Tencent Classroom, DingTalk Live, and Superstar Classroom enable students and teachers to feel the depth and breadth of knowledge dissemination even though they are thousands of miles away. Rich media itself is not information, but in teaching activities, when teachers impart complex and difficult theoretical knowledge, derivation algorithms, formula principles, etc. to students through flash animations, videos, 3D displays, simulation techniques, etc., it makes students more convenient and vivid in understanding and mastering, thereby improving teaching effectiveness.

2.2. Rich Teaching Resources under New Media

Under the new form of teaching, teaching resources have become more diverse and diverse. Teaching resources are all available materials provided for the effective implementation of teaching. It can include various textbooks, film and television materials, pictures and charts, courseware PPTs, actual cases, etc., as well as teacher resources, teaching aids, infrastructure, etc. In a broad sense, it should also involve content such as educational policies. Narrowly speaking, teaching resources (learning resources) mainly include teaching materials, teaching environment, and teaching support systems. The new form of classroom teaching materials includes traditional paper resources and electronic materials, and electronic materials include modal data such as video, audio, text, biology, etc.

2.3. Intelligent Teaching Methods under New Media

Under the new teaching form, teaching resources and

teaching environment have undergone tremendous changes, and the corresponding traditional teaching method - classroom interaction of "teachers speaking and students listening" - will far from meet the needs. Digital resource network and various teaching platforms have brought more intelligent teaching and learning methods. Human computer interaction, intelligent perception, Affective computing, intelligent windows and other information interaction and knowledge transfer methods will appear more frequently in the new classroom.

The new form of textbooks is an important component of the "reform of teachers, textbooks, and teaching methods". Utilizing the new form of textbooks to carry out blended teaching has important value in changing the classroom ecology and improving classroom quality. The new form of textbooks is based on internet technology, which organically connects paper textbooks, online textbook electronic resources, and online teaching platforms through QR codes. It can effectively compensate for the content that paper textbooks cannot carry. Teachers can update online textbook electronic resources at any time, effectively promoting teaching reform. This kind of teaching material is conducive to students' self-study and preview, and can well support micro class, Flipped classroom and other mixed teaching modes.

3. Design of Teaching Mode based on New Forms of Textbooks

3.1. Features of Micro Class and Flipped Classroom

The core component of micro courses is classroom teaching videos, which also include auxiliary teaching resources related to the teaching theme, such as teaching design, material courseware, teaching reflection, practice testing and student feedback, teacher feedback, etc. Micro courses are different from traditional single resource types of teaching resources such as lesson examples, teaching courseware, teaching design, and teaching reflection, and are also a new type of teaching resources inherited and developed based on them.

The Flipped classroom teaching mode is a teaching method supported by high and new technologies such as computer multimedia and the Internet. It is flexible in form and active in the classroom atmosphere, which helps teachers and students interact, puts students in the main position of learning, mobilizes students' enthusiasm for learning, and improves their learning subjectivity. It is a new achievement of education and teaching reform under the new situation.

3.2. The Application of Mixed Teaching Models Such as Flipped Classroom

With the continuous reform of public mathematics courses in universities, the teaching process not only focuses on students' learning of mathematical knowledge, but also increasingly emphasizes the cultivation of students' mathematical thinking and self-learning ability. However, the introduction of micro class and Flipped classroom in college mathematics teaching is just in line with the trend of college mathematics teaching reform. Micro courses can supplement students with knowledge beyond the mathematics classroom in their spare time, mainly including the cultivation of mathematical logical thinking and the popularization of relevant mathematical knowledge. The teaching content

generally includes the extension of university classroom content and unconventional mathematical knowledge, helping students break through conventional thinking, cultivating students' mathematical logical thinking, and better expanding the mathematical learning ability of university students.

3.3. Design of Teaching Mode based on New Forms of Textbooks

The teaching mode of Flipped classroom mainly includes three stages, namely, the students' flipped enlightening learning stage before class, the interactive deepening learning stage in class and the consolidated learning stage after class. The mixed teaching process based on the new form of textbooks is similar to the Flipped classroom, and it can also be divided into three parts before class, during class and after class, but the connotation is different. On the basis of early teaching practice, Linear algebra course teaching adopts online and offline hybrid teaching mode, including: pre learning at the front of class, offline teaching at the middle of class, online communication and feedback after class.

(1) Online pre learning

Before each class, assign pre class tasks based on the teaching objectives of this class (knowledge and ability objectives and ideological and political objectives of the course), which mainly include: 1) pre learning the main content of this class according to the requirements of the task list (distributing course PPTs and related videos in advance), and asking questions. Because the teaching mode adopts mixed teaching, students' learning content on the front line of the class is not exactly the same as that of offline learning in the class. Before the class, some easy-to-understand knowledge points have been pre learned to meet the learning requirements, so teachers have enough time to discuss more important difficult to understand knowledge points, solve problems, and discuss in depth. 2) Reading the learning materials related to this course (such as biographies of relevant celebrities and knowledge extension applications distributed to online platforms in advance), the classroom time is limited, and it is unrealistic to introduce the application of knowledge related to character biographies for a large period of time. Through pre class reading, the combination of ideological and political elements and knowledge points in the classroom is completed naturally, achieving the clever and natural integration of ideological and political elements into the classroom Recommend excellent teaching videos and websites related to the course on the teaching platform for reference by students with spare time.

(2) Offline teaching during class

The 45-minute instructional design in class requires careful polishing by the teacher. There are various teaching methods that can be used in the classroom teaching environment, such as exploratory learning (HIBL) and problem-based learning (PBL). In the classroom teaching process, teachers should further analyze, explain, and inspire important knowledge points that are difficult to understand, so that students can digest the knowledge points in the classroom and deepen the effectiveness of deep learning. At the same time, ideological and political elements should be introduced in a logical manner to achieve harmony and unity, and professional knowledge and ideological and political education should complement each other.

(3) Online communication and feedback after class

After class, we should utilize the superior functions of

mobile platforms to fully communicate with students. In addition to completing homework and answering questions, we can also delve into teaching methods and content with students. We can further modify the teaching design based on the students' feelings after introducing ideological and political elements into classroom teaching.

4. The Impact of New Forms of Textbooks on Teaching Activities

4.1. The Role of Teachers has Changed

Firstly, teachers have transformed from traditional knowledge imparters in the classroom to facilitators and guides of learning. The teacher is no longer the master of the classroom, and the classroom is no longer the teacher's voice. The dominant position of students is fully reflected in micro classes and Flipped classroom, and the dominant position of teachers has not been weakened, but strengthened. Teachers should proficiently master the organizational strategies of some learning activities, such as problem-based learning, project-based learning, group learning, gamified learning, role-playing, and so on. Secondly, teachers have transformed from disseminators of teaching content to designers and developers of video resources, as well as providers of related educational resources. Before class, teachers need to provide students with necessary resources, such as teaching videos, courseware, and other online resources to explain relevant knowledge, so that students can have a more comprehensive understanding of the knowledge they have learned. When students need help, teachers will provide them with necessary support. Therefore, teachers have become scaffolding for students to easily access resources, utilize resources, process information, and apply knowledge to real situations.

4.2. Changes in Student Roles

In the personalized learning under the micro class and Flipped classroom teaching mode, students become self-paced learners. They can control the choice of learning time and place, as well as the amount of learning content and amount. Students are the protagonists of the entire learning process and are no longer passive recipients of knowledge in traditional classrooms. Students can understand and absorb what they have learned in class through group learning and Collaborative learning. Students who master quickly at the same time can help those who do not, and assume the role of a teacher as a "teacher".

4.3. Reassignment of Classroom Time

Another core feature of micro class and Flipped classroom is to reduce the teacher's teaching time and leave more time for students' learning activities in the classroom. In the micro class, flipped classroom and other teaching modes, the content of the original classroom teaching is completed before class through network technology. On the basis of not reducing the transfer of basic knowledge, the interaction between teachers and students in the classroom is enhanced. By maximizing the "preview time", the extension of teaching and learning time is completed, realizing the deep internalization of knowledge, so as to improve learning efficiency.

4.4. Increase Interaction with Students in Learning

Micro class and Flipped classroom have greatly improved

the interaction between teachers and students as well as between students in the classroom. Due to the fact that students engage in a certain degree of deep learning of the upcoming courses through teaching videos, the main focus in the classroom is on student questioning, teacher answers, and discussions and exchanges between students, which fully enhances students' sense of ownership in the classroom and enables them to actively participate in the learning process. When teachers conduct evaluations, interactivity in the classroom becomes more effective. Based on the teacher's evaluation feedback, students will have a more objective understanding of their learning situation and better control over their learning.

5. Conclusion

To sum up, the new form of teaching materials can promote the new form of teaching model, which has a strong scientific and progressiveness. For this reason, the teaching of Linear algebra should reasonably develop and use new teaching resources to make up for the shortcomings of the traditional classroom teaching mode, provide students with more abundant learning methods, stimulate students' learning interest, give full play to students' subjective initiative in mathematics learning, and then improve students' mathematics learning ability to provide assistance for students' future development.

Through the use of mixed teaching methods, students can master the basic theories and methods of Linear algebra; Combining theory with practice, fully unleashing students' subjective consciousness, encouraging them to make analysis and decisions, transforming passive listening into active thinking, and inspiring students' thinking; Cultivate students' interest in mathematics courses, problem-solving skills, and lay a solid foundation for learning subsequent professional courses, achieving the cultivation of innovative awareness, thinking, and ability.

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