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Construction and Implementation of a Hybrid Teaching Model for College Mathematics in a Mobile Learning Environment

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Abstract: With the rapid development of science and technology, mobile teaching, as a new teaching model, has gradually attracted the attention of education departments and school teachers, and has been widely applied in university education. This teaching mode can break through the limitations of time and space, guide students to engage in daily learning anytime and anywhere, and further improve the quality and efficiency of students' learning. College mathematics has strong abstraction, thinking, and logic, and involves many formulas, operations, graphics, and concepts, making the overall learning difficulty relatively high. In the specific practice of carrying out university mathematics teaching, teachers should closely follow the pace of educational development, update educational concepts and methods in a timely manner, build a comprehensive blended teaching model based on mobile learning, and inject new vitality and vitality into the efficient development of university mathematics teaching. This article mainly elaborates on mobile learning and blended teaching modes, analyzes the advantages and requirements of blended teaching in university mathematics based on mobile learning, explores the construction of blended teaching mode in university mathematics based on mobile learning, and then puts forward scientific and reasonable suggestions based on the actual situation, in order to fully utilize the maximum efficiency of mobile learning and lay a solid foundation for the efficient development of blended teaching in university mathematics.

1. Introduction

In the current process of social development, the number of netizens in China has significantly increased. As a common mobile internet device, mobile phones and tablets play a crucial role in the lives of college students. Mobile phones and tablets are products of the development of the times, like a double-edged sword. They can provide more convenient conditions for students to learn and communicate, but students with poor self-control ability can easily become "low headed". In 2000, Dr. Keegan of Ireland introduced the concept of mobile learning into China, sparking a wave of research and application of mobile learning. Mobile learning refers to the process of using mobile

communication technology to learn on various portable devices. This learning method breaks through the time and space limitations of traditional teaching and has characteristics such as personalization, openness, collaboration, interactivity, and immediacy. With the rapid development of mobile internet technology and the continuous deepening of educational informatization reform, mobile learning has brought a huge impact to our traditional education methods, causing profound and long-term changes to our education system. As an extension of digital learning, mobile learning breaks the boundaries between classrooms and campuses in the learning environment, bringing learners a new learning experience. It is a learning method with the characteristics of "Anyone, Anywhere, Anytime, Anystyle"[1], which has gradually penetrated into the learning and life of modern college students and is becoming increasingly important. After the sudden outbreak of the COVID-19 at the end of 2019, in order to meet the needs of universities and primary and secondary schools to carry out large-scale online courses, all platforms have played a great role in supporting the development of online courses. After entering 2020, 5G intelligent technology will also bring greater impact to teaching modes, and the reform of mobile learning assisted hybrid teaching mode is imperative. At present, many studies in China have explored the theoretical and practical issues of mobile learning. In terms of theory, it mainly includes the definition of mobile learning concepts, feature analysis, resource composition, design principles, etc. In practice, there are mainly mobile learning conducted using mobile phones and WAP websites, as well as mobile learning based on tablets. Mobile learning is a new teaching mode that has emerged in the Internet era, providing new ideas for university mathematics teaching.

2. Related Overview

2.1. Mobile Learning

Mobile learning refers to a learning mode that utilizes mobile communication technology and devices to transmit learning resources, tools, and methods through wireless networks and other internet access methods through mobile terminals. Due to the portability, mobility, one-way information, and support for multimedia content transmission of mobile devices, mobile learning has unparalleled advantages over other learning modes, enabling learning anytime and anywhere. According to the different types of mobile terminals, mobile learning can also be divided into two types: fixed terminals and mobile terminals. At present, the definition of mobile learning by domestic and foreign researchers mostly comes from the understanding and definition of this concept. From the current research results of domestic scholars, it can be seen that their definitions of mobile learning are basically consistent, but there are also certain differences [2].

Mobile learning mainly utilizes mobile terminal devices such as smartphones and tablets to vividly and concretely present rich learning content to students, allowing them to access learning resources and information through the internet according to their own learning needs, while communicating and learning with teachers and classmates. It is an innovative teaching model that is in line with the development of the times. Compared with traditional teaching models, mobile teaching has inherent characteristics such as being anytime, anywhere, fragmented, and interactive, which can effectively compensate for the shortcomings of traditional teaching models and bring students a better learning experience. Firstly, the anytime and anywhere nature of mobile teaching. Mobile teaching does not have clear requirements for students' learning time and place, and students can learn at any time and place, which provides very convenient conditions for students' autonomous learning. Secondly, the fragmentation of mobile teaching. Students can use any fragmentation time such as recess, waiting for a bus, taking a bus, etc. to carry out mobile learning, improve the utilization rate of fragmentation time, let students master a knowledge point in a few minutes, and finally form a complete knowledge system. Finally, the interactivity of mobile

teaching. Mobile phones are the most widely used mobile learning devices for students, with strong interactivity. They can achieve two-way information flow through various means such as voice, video, and text, and have a very positive impact on teacher-student interaction and student-student interaction.

2.2. Mobile Learning Theory

2.2.1. Informal Learning Theory

The theory of informal learning was proposed by American scholar Malcolm Knowles et al. Informal learning refers to learning conducted in an informal environment, that is, non-school and enterprise education and training. It emphasizes the autonomy and spontaneity of human learning, and achieves the accumulation of personal knowledge and experience through interaction with others and browsing online platforms. Informal learning emphasizes the various activities that learners participate in during the learning process, which are not limited by formal learning time and location. With the development of wireless technology and mobile communication technology, especially the emergence of mobile communication networks such as 3G and 4G, learners have been provided with more opportunities to communicate with others. Learners can learn anytime and anywhere through mobile devices such as smartphones and tablets. In addition, mobile learning has the characteristics of freedom, diversity, and personalization in time and space. Learners can use mobile devices such as smartphones and tablets to access web pages, multimedia resources, and interact with other learners to complete learning tasks.

2.2.2. Situational Cognition and Learning Theory

The theory of situational cognition and learning was proposed by American psychologist Jean Lave in the early 1980s. It believes that cognition is the process of constructing the meaning of knowledge in a certain context, using appropriate cognitive tools, cognitive strategies, learning strategies, and knowledge organization and processing. Learning is a social interaction activity that learners engage in to meet individual needs in a certain context. Scholars believe that mobile learning is an "environmental" learning that utilizes mobile devices as intermediaries to effectively organize various information and resources [3]. The theory of situational cognition and learning emphasizes that learners are people in a specific context, and they need to learn and work in a specific context. This theory provides a fundamental understanding of mobile learning and points out that it should be learner centered and promote the process of constructing knowledge meaning through various media, thereby enhancing learners' skills and literacy.

2.2.3. Activity Learning Theory

The Activity Learning Theory (ALT) is based on constructivist learning theory. This theory believes that students' learning activities are a planned and organized process, in which learners will learn how to complete a certain task, rather than mastering a certain knowledge through teacher teaching. In the theory of activity learning, learners are no longer passive recipients of knowledge, but active participants in the process of knowledge construction. In this process, learners can actively explore knowledge and solve problems, rather than passively accepting teacher lectures. Therefore, in mobile learning, teachers can fully utilize various resources provided by mobile terminal devices and their application systems to guide students to learn through independent exploration.

2.2.4. Experiential Learning Theory

The individual's learning process mainly includes four aspects: direct experience, indirect experience, action practice, and reflective cognition. Among them, direct experience refers to the information and events that individuals directly perceive; indirect experience refers to information and events that are indirectly perceived through observation, reading, and other means; Action practice refers to individuals experiencing knowledge through their own actions; Reflective cognition refers to individuals reflecting on their own behavior and effects, and summarizing experiences and lessons. Among them, direct experience includes information and events perceived by the body's senses, while indirect experience includes information and events indirectly obtained or perceived. From the above analysis, it can be seen that direct experience is the most easily accepted learning content for learners, while indirect experience and action practice require learners to possess certain learning abilities. Therefore, mobile learning should focus on direct experience rather than indirect experience [4]. In addition, mobile learning can also adopt the method of action practice to carry out learning activities.

Research on mobile learning in China has been ongoing since the 1990s, but it was not until 2005 that research on the definition of mobile learning concepts, as well as the characteristics, resource composition, and design principles of mobile learning, gradually improved. Since 2005, research on mobile learning has been more focused on practical and commercial promotion. During this period, there were three main characteristics of relevant literature: firstly, in theoretical research, scholars studied mobile learning from different perspectives and reached a consensus on the definition of mobile learning; Secondly, in theoretical research, researchers have begun to pay attention to technical issues in mobile learning; Thirdly, in theoretical research, the factors that affect the application of mobile learning, as well as practical aspects such as the development of educational platforms, were explored.

2.3. Mobile Learning Platform

At present, the main platforms for mobile learning include Super Star Learning Pass, Blue Ink Cloud Class, Rain Classroom, Micro Teaching Assistant, WeChat, QQ, DingTalk, etc. With the continuous optimization of internet technology and the continuous improvement of mobile phone performance, the above-mentioned mobile learning platforms have also been constantly updated, with increasingly rich and complete functions. For Superstar Learning Pass, it is developed by Superstar Group and is an APP software centered on online teaching platforms, effectively integrating classroom, mobile, and management ends. In Superstar Learning Connect, students can access various course resources anytime and anywhere, and teachers can deeply integrate online and offline blended education. In addition, Superstar Learning Connect can support the scientific research co construction and resource sharing of professional teaching teams and course teaching teams. For the Blue Ink Cloud Class, it is launched by Beijing Zhiqi Blue Ink Information Technology Co., Ltd. It can achieve effective interaction within and outside the classroom with the help of intelligent devices and network cloud service platforms, and provide timely feedback on teaching content. At the same time, Blue Ink Cloud Class pays more attention to class management, and mobile related operations are also more convenient. For Rain Classroom, it is jointly developed by Xuetang Online and Tsinghua University Online Education Office. It can effectively connect teachers' intelligent terminals with students' intelligent terminals, providing students with a new experience in various stages of pre class preparation, in class teaching, and post class consolidation, effectively leveraging the inherent power of teaching and learning. The Rain Classroom includes two sections: teachers and students, with the teacher side having many functions such as learning resource push, learning task release, student data analysis, and evaluation feedback; The student end

has many functions such as course selection, scanning check-in, bullet screen interaction, and learning feedback. It is worth noting that Rain Classroom does not have an independent APP software, so teachers and students need to bind WeChat before they can enter. For micro teaching assistants, it is jointly launched by Tian Yuan, a teacher from the School of Psychology at Huazhong Normal University, and the professional team of Huazhong University of Science and Technology. It has multiple functions such as classroom testing, classroom check-in, and classroom discussion, encouraging students to participate in classroom interaction in a gamified manner. It has inherent characteristics such as easy operation, strong practicality, and interesting process evaluation. For WeChat, it is a social software from Tencent, with very comprehensive online video functions and a large user base. It can receive various teaching resource links and files, and teachers can interact with students through WeChat [5]. For QQ, it was Tencent's early social software. Teachers can use the QQ group's group classroom function to provide online video lectures for students, and students and teachers can also use the QQ group for learning, communication, and resource sharing. However, in the process of applying QQ, some advertisements and plugins may pop up, which may interfere with students' autonomous learning. For DingTalk, it is a professional office software with powerful video conferencing functions. With students turning on their cameras, teachers can see more students and the overall classroom interaction effect is better. However, there are high requirements for the network and hardware. If the computer itself has a low configuration, it will experience adverse phenomena such as crashes and stutters, which will affect the learning experience of students.

2.4. Overview of Blended Teaching Mode

In the 1990s, the concept of blended learning was officially proposed, which mainly emphasizes the integration of various teaching resources, teaching theories, teaching methods, teaching styles, teaching environments, and teaching evaluations. Through complementary advantages, it effectively stimulates students' learning interest, fully utilizes students' subjective initiative, and further enhances students' sense of participation in classroom learning. In this teaching model, the role of teachers in the classroom is gradually weakened, no longer just lecturing on knowledge points, but as guides and inspirations for students, leading them to efficient learning. With the continuous deepening of educational reform, the current blended teaching mode mainly involves the effective integration of offline and online teaching, which is the effective integration of real teachers and virtual network teaching environments [6]. It can expand students' knowledge and further promote their comprehensive development.

3. Analysis of the Advantages of Hybrid Teaching in College Mathematics Based on Mobile Learning

3.1. More Abundant Teaching Resources

For traditional university mathematics teaching models, students often rely on fixed textbooks, reference books, and problem sets for learning, and the entire learning process has strong singularity and limitations. In the rapidly developing modern society of information technology, the blended teaching mode of university mathematics based on mobile learning includes a massive amount of course materials, e-books, PPT courseware, and even AR technology-based textbooks and teaching resources. Students only need to lightly click the mouse or screen to retrieve relevant resources, which provides a good prerequisite for students' autonomous learning. During the teaching process, teachers can also design various links for students, such as question answering, group discussions, and online tests, to guide students to actively explore knowledge, and adjust the teaching progress

and content in a timely manner based on students' learning status, so that the current teaching can be more in line with students' actual needs.

3.2. More Significant Teaching Effect

Under the hybrid teaching mode of college mathematics based on mobile learning, teachers only need to publish teaching plans, videos of micro lessons and learning tasks to the designated website, and do not need to repeat the preparation of teaching plans and the copying of exercises, which greatly alleviates the work pressure of teachers, allows teachers to have more time and energy for teaching design, and guides students to conduct independent inquiry and cooperative learning, Thus further improving teaching efficiency. For key and difficult knowledge, in the blended teaching mode of university mathematics based on mobile learning, teachers will focus on explaining it, and students can also learn repeatedly [7]. Through communication and exchange among group members, students can deepen their understanding and perception of key and difficult knowledge, so the final teaching effect will be more significant. In addition, college mathematics itself is a subject with high difficulty, and some students may not be able to keep up with the teacher's classroom pace, resulting in students being "unable to keep up step by step, unable to keep up step by step", which seriously suppresses students' learning enthusiasm and even leads to self-denial. The blended teaching model of university mathematics based on mobile learning can effectively compensate for the limitations of traditional teaching models, allowing students to promptly check and fill in gaps during class hours, thereby fully understanding and digesting knowledge points, and preventing problems from accumulating.

3.3. More Harmonious Teacher-Student Relationship

For traditional university mathematics teaching, there is less communication and exchange between teachers and students. After the end of a semester, teachers often can only remember a few outstanding students. In the blended teaching mode of university mathematics based on mobile learning, communication and exchange between teachers and students have significantly increased, and some students with weak basic knowledge have also received attention from teachers. The overall teacher-student relationship is more harmonious and stable, and students' sense of participation in the classroom has also been significantly improved. At the same time, for some introverted and easily shy students, they may have a significant psychological burden when communicating face-to-face with teachers, and even some students are very afraid of making eye contact with teachers. The blended teaching mode of university mathematics based on mobile learning, where both teachers and students are present on or behind the screen, can greatly alleviate students' shyness and timidity, facilitate communication and communication with teachers, and further optimize the relationship between teachers and students.

3.4. More Reasonable Evaluation System

For a long time in the past, teaching evaluation mainly focused on students' grades, lacking effective evaluation of their learning process [8]. In the blended teaching mode of university mathematics based on mobile learning, it can record students' check-in time, learning duration, platform visits, and homework completion status, making it easy for teachers to timely grasp students' learning status and promote the continuous development of the evaluation system towards a more reasonable direction.

4. The Construction of a Hybrid Teaching Model for College Mathematics in a Mobile Learning Environment

4.1. Pre Class Preparation Stage

Whether the pre class preparation work is fully implemented directly determines the final effect of the blended teaching model in university mathematics. Before carrying out blended teaching in university mathematics, teachers should comprehensively grasp the various teaching functions of mobile learning platforms, and then combine the current teaching content and needs to construct a blended teaching model for university mathematics based on mobile teaching. At present, the pre class preparation work for the blended teaching mode of university mathematics based on mobile learning mainly includes background analysis, knowledge analysis, and student characteristic analysis. Firstly, background analysis. Background analysis mainly refers to understanding the hard environment such as media facilities and class settings, as well as the soft environment such as teaching philosophy, teaching style, teaching atmosphere, and teaching evaluation. Secondly, knowledge analysis. Knowledge analysis mainly refers to grading basic knowledge to meet students' differentiated learning needs. Finally, analyze the characteristics of students. Student characteristic analysis mainly refers to mastering students' knowledge reserves, cognitive levels, learning preferences, learning attitudes, and other characteristics, laying a solid foundation for the comprehensive implementation of "individualized teaching"[9]. If it is the first time that teachers have conducted blended teaching of college mathematics on a mobile learning platform, they should establish courses, import student lists, design teaching plans, upload information resources, guide students to download corresponding mobile learning apps, and do a good job of course preparation on the mobile learning platform. For example, a certain teacher assigned preview tasks to students in advance when carrying out blended teaching of college mathematics, requiring them to log in to the mobile learning app software, watch micro lessons, animated videos, and PPTs. They also set appropriate test questions based on the students' knowledge level, using micro lessons, animated videos, PPTs, and test questions as task points to organize students to engage in autonomous learning. In the process of self-directed learning, students need to mark or record areas they do not understand, and then initiate discussions on the mobile learning app software, or directly participate in ongoing discussions to promptly solve their own confusion.

4.2. In Class Teaching Stage

After the end of pre class learning, teachers should conduct a comprehensive analysis of students' learning situation, and develop scientific and reasonable teaching goals and strategies based on the analysis results. For the knowledge points that students generally understand, teachers can simply pass by; Teachers should emphasize the common problems among students and fully leverage their classroom role through various methods such as inspiration and guidance, group discussions, and task driven approaches, guiding students to actively think and express their ideas. For the parts with low accuracy in the test questions, teachers should provide detailed explanations, and then select the students who made mistakes based on the actual situation to explain again, so that students can learn knowledge with the questions and effectively improve their learning quality and efficiency. At the same time, teachers should also incorporate students' comprehensive performance into the process evaluation, in order to effectively improve students' classroom participation. For example, when a teacher was teaching the relevant knowledge of "definite integral application to calculate the volume of a rotating body", he carried out mixed teaching based on mobile learning. In the process of classroom allocation, the teacher designed five links based on teaching needs, namely scenario introduction, knowledge explanation, interactive review, classroom connection, and summary[10].

Before the formal class, the teacher assigned pre class tasks to the students through the cloud classroom, and through communication and interaction with the students, comprehensively grasped their learning status. Then, using the check-in function of the cloud classroom, the actual attendance rate of the students was clarified, and the completion of pre class tasks was displayed to the students, with detailed explanations for incorrect questions; After completing the pre class task explanation work, the teacher vividly presented the internal characteristics of geometric bodies to the students through micro videos. Then, with the help of physical images, the teacher showed the volume elements to the students, and with the help of mathematical software, simulated the formation process of rotating bodies. Based on the actual situation of the students in the class, using the basic principles of "same group heterogeneity" and "heterogeneous same group", the students are divided into 8 groups, with 6 members in each group. The students are organized to derive expressions for the volume elements of the rotating body in groups. After the end of cooperative learning, each group will send a representative to explain the discussion results of the group, and then the teacher will make comments. Finally, the teacher summarizes and summarizes the knowledge points of this lesson, emphasizing the calculation methods. Through online testing, discussion and communication, classroom interaction, etc. in the cloud classroom, students' comprehensive performance is scored in real-time, and then their classroom grades are announced [11].

4.3. After Class Expansion Stage

After completing the in class teaching, students often have a deep understanding of the knowledge content of this lesson, but this does not mean the end of this lesson. Teachers should also actively carry out after-school expansion work based on students' learning situations, assign scientific and reasonable expansion tasks to students, and cultivate their good exploration and knowledge transfer abilities. In the process of assigning expanding tasks, teachers should divide students into different levels based on their comprehensive level, and then effectively decompose the expanding tasks according to the learning status and needs of students at different levels. Students are required to complete the expanding tasks through teamwork, helping them form a sense of cooperation and team spirit.

5. The Implementation of Hybrid Teaching Mode in College Mathematics under the Background of Mobile Learning

5.1. Analysis of Academic Situation

In order to facilitate the smooth progress of teaching activities, promote learners' initiative, and improve teaching effectiveness, we must analyze learners' learning foundation, attitude, and ability before designing specific teaching activities.

In recent years, the mathematical foundation of students in our school has shown a decreasing trend year by year, especially in the field of preschool education. Mathematics courses have been marginalized, with a significant reduction in curriculum, and the teaching volume in mathematics classrooms has not met the standards. Although students have studied high school mathematics courses for two years, their learning foundation is still very weak [12]. These students majoring in preschool education directly enter vocational schools after graduating from junior high school, breaking away from the control of their parents and enhancing their self-awareness. Therefore, they often exhibit mature behavior and emphasize individuality, but they are also sensitive and need attention and respect. In the process of course learning, students' learning attitude and ability largely depend not on their own abilities, but rather on whether their learning needs are suitable for the teaching content. They have strong adaptability and communication skills, and are emotionally outward oriented. Boring theoretical knowledge cannot attract their sustained attention, this requires

our teachers to explain through new technologies and methods in teaching activities, and cultivate students' innovative and practical abilities.

5.2. Teaching Preparation

According to the new curriculum standards, "College Mathematics" is offered in the third year of preschool education majors. Compared to the study of high school mathematics in the previous two years, the content of college mathematics is more abstract and rigorous, with higher requirements for logical thinking ability. The teaching content is also very complex, and students find it difficult to deeply understand and master some theoretical knowledge. Therefore, teachers and students are in a "double difficulty" dilemma [13]. In order to get rid of the dilemma, we screened the content in the textbook "College Mathematics", analyzed the structural connections between fragmented knowledge points, and constructed knowledge points and knowledge networks suitable for mobile mathematics learning. Finally, we chose the three chapters of limit and continuity, derivative and differential, and integral as our one-year learning tasks.

Firstly, we will refine the learning tasks one by one, divide the content of each chapter again, plan the learning content of each lesson in advance, and ensure that the design of the knowledge points in each lesson is brief, independent, and focused. Secondly, with the help of various existing websites, such as the National Excellent Course Website, National Resource Sharing Course, China University MOOC, Sciyard Digital Garden, etc., download the learning resources you need, summarize and compile them, and produce more targeted micro course videos.

5.3. Implementation of Blended Teaching Mode

Mixed teaching is carried out in a combination of online and offline mode. Due to the limited classroom time, students need to organize fragmentation learning after class to make up for the lack of classroom teaching. According to the Pareto principle proposed by Jay Cros, 80% of human knowledge is obtained through informal learning. Therefore, with the help of mobile terminals, learning is no longer controlled by time, region and environment, and better "teaching" and "learning" can be achieved between teachers and students.

5.3.1. Teacher's "Teaching"

Before class, teachers should develop mobile platform learning resources and publish learning tasks to mobile learning platforms, such as Chaoxing Xuetong and the writing platform of the correction website. In other words, teachers need to provide input materials appropriately according to the needs of the output task, and in this case, teachers play the role of resource developers or providers. The design of input materials should reflect the following characteristics: firstly, video miniaturization. Micro videos facilitate learners to use their spare time for learning. The second is to focus on the theme of each video unit. All videos are recorded around a single theme, giving learners a sense of achievement after mastering the relevant content of the theme. The better the match between input materials and output tasks, the higher the motivation of students to learn and the efficiency of absorbing new knowledge. Learners log into Superstar Learning Connect and carry out self-directed learning according to the output task requirements released by the teacher, preparing for classroom output activities.

5.3.2. Requirements for Instructional Design

Mobile learning is a supplement to traditional teaching, with the fundamental goal of meeting students' personalized learning needs. In the process of teaching design, teachers should have an open thinking mode, effectively improve the openness of teaching content, teaching media, teaching strategies, and test questions, and establish clear learning objectives to effectively avoid the

blindness and confusion of mobile learning. In addition, teachers should pay sufficient attention to the modularization of mobile learning, continuously enrich the teaching resources of mobile learning, and strengthen students' autonomous learning from multiple levels and perspectives [14].

The design of classroom teaching activities should be closely linked to the learning content of the platform, and there should be no "two skins" phenomenon between classroom teaching and mobile platform learning. The key to leveraging the effectiveness of blended learning lies in how to organically integrate online and classroom teaching activities through instructional design, maximizing the teaching benefits of both. In classroom teaching, teachers should create as many interactive opportunities as possible and allow students to engage in training. In this process, teachers not only need to evaluate students' performance, but also provide various assistance for their output activities, playing the role of "scaffolding". Wen Qiufang pointed out, "When preparing for classes, teachers need to refine the specific steps and content of building their own scaffolding, in order to monitor and evaluate the effectiveness of the assistance provided, and ensure that students' abilities are gradually improved.

5.3.3. Requirements for Students' Basic Abilities

Mobile learning requires students to have higher levels of self-directed learning and self-control abilities. It requires students to have good learning habits, self-discipline, and enterprising spirit, as well as maintain curiosity and thirst for knowledge, and be able to engage in self-directed learning without constraints.

5.3.4. Requirements for Micro Course Videos

Micro class has the inherent characteristics of being short and pithy. It can be controlled in 5-10 minutes when growing up. It can well solve the key and difficult problems in college mathematics teaching, help students make rational use of fragmentation time, and has the effect of icing on the cake. For an excellent micro lesson video, it not only requires novel creativity, but also requires good production and application abilities. The requirement for comprehensive literacy is very high, so it is difficult to complete it solely by the personal strength of the teacher. In this situation, universities can actively seek the help of teaching teams and educational information companies, thereby laying a solid foundation for the efficient implementation of mobile teaching.

6. Suggestions for Blended Teaching of College Mathematics in the Context of Mobile Learning

6.1. Fully Implement Student Supervision Work

The blended teaching mode of university mathematics based on mobile learning allows students to have relatively free learning time and space, but this does not mean that students can do whatever they want. If students lack necessary constraints during the learning process, they are likely to fall into a state of freedom and idleness, greatly reducing their learning quality and efficiency. In the current social development process, the Internet itself has a strong openness, and various information explosion growth. In order to promote the efficient implementation of blended teaching mode in university mathematics, teachers should comprehensively implement student supervision work through the reasonable application of mobile learning APP software, record students' learning behavior in detail, effectively increase the constraints of mobile learning APP software, and avoid students becoming addicted to online entertainment[15]. In addition, schools should also attach sufficient importance to ideological education work, help students correctly understand the significant value of mobile learning, effectively grasp the basic methods of mobile learning, cultivate students' ideal beliefs in autonomous learning, and provide strong guarantees for the efficient progress of students' mobile learning. On the mobile learning app software, schools should

require students to log in with their real names, so as to clearly display the learning time and frequency of each student; at the same time, teachers should regularly check the browsing records of students and clarify whether they are following the teaching steps to carry out learning activities. If students' learning state is relatively slack, teachers should communicate and exchange with them in a timely manner, understand their psychological state, and provide necessary criticism and education to further improve students' learning efficiency and avoid mobile learning becoming a mere formality.

6.2. Optimize Teaching Methods

In the practice of implementing blended teaching in college mathematics, teachers should have a clear understanding of the inherent characteristics of college mathematics, transforming dull and tedious mathematical knowledge into vivid and vivid images, videos, and animations, effectively mobilizing students' various sensory organs, effectively focusing students' classroom attention, and helping students master mathematical knowledge more efficiently. At the same time, teachers can also timely grasp students' online learning situation through survey questionnaires. If students lack good online support during their online learning process, teachers can send teaching materials such as courseware, e-books, and videos to the class's WeChat group or QQ group, thereby providing good conditions for students' online learning. After the teaching activities are completed, the teacher should provide a brief explanation of the teaching content for the next class, arrange the students' preview tasks reasonably, and require them to take photos and upload them. The teacher should design the teaching accordingly based on the students' preview situation, in order to reduce unnecessary classroom time waste.

6.3. Improve Blended Teaching Classrooms

Based on mobile learning in blended teaching of university mathematics, teachers should pay sufficient attention to classroom design work, continuously strengthen the connection between pre class preparation, in class explanation, and post class consolidation, effectively highlight students' classroom role, actively cultivate students' good mathematical thinking, and comprehensively optimize students' mathematical core literacy [16]. At the same time, the blended teaching mode of university mathematics based on mobile learning is an effective integration of online and offline teaching. Therefore, it is divided into two sections: classroom teaching and online teaching. How to achieve a close connection between classroom teaching and online teaching is also a key issue that teachers should focus on. During the teaching process, teachers should conduct a comprehensive analysis of students' learning status, and based on this, select teaching content that is suitable for students' comprehensive development, thereby forming a complete teaching chain and avoiding the disconnection between classroom teaching and online teaching.

7. Conclusions

The blended teaching mode of college mathematics based on mobile learning has richer teaching resources, more significant teaching effects, more harmonious teacher-student relationships, and more reasonable evaluation systems. It is applied in college mathematics teaching before, during, and after class, greatly benefiting the efficient development of college mathematics teaching. In response to this situation, teachers must recognize the current trend of education development, fully utilize the advantages of the Internet and information technology, and enable university mathematics teaching to truly keep up with the times.

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