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The Role of Multimedia Technology in the Construction of the Excellent Course of Analytical Geometry

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Abstract: *Through multimedia teaching methods, it can provide a good and harmonious learning environment for cultivating students' innovative awareness and practical ability, transform the classroom into a place where students can freely guess in the learning process, and divergent thinking can improve the quality of teaching level through the scientific and reasonable application of multimedia teaching methods in the course of Analytical Geometry.*

Keywords: *Multimedia Technology; Analytical Geometry; Quality Course Construction*

1. Introduction

To integrate modern multimedia teaching methods into the teaching class of Analytical Geometry is not only to transform the knowledge content in the current textbook into digital and information-based multimedia teaching courseware, nor to replace the traditional blackboard with a computer screen. How to scientifically and reasonably use multimedia teaching methods to improve the level and quality of classroom teaching of Analytical Geometry is the key factor for students to master the content of mathematics.

2. Advantages of multimedia teaching

2.1 Using multimedia teaching can improve teaching efficiency

The course of Analytical Geometry is complex and virtual. It is the intuitive expression of mathematical theoretical knowledge by simple and accurate language. However, in the course of classroom teaching of Analytical Geometry, it is impossible to transfer the teaching content by simple language. It needs a lot of writing and painting. Therefore, the scientific and reasonable use of multimedia teaching methods to display the theoretical knowledge of Analytic Geometry in an all-round, multi-angle, multi-level, and multi-changing three-dimensional way. Through the powerful information processing and image processing functions of computer multimedia technology, teachers can save drawing time, and then can invest more time and energy to guide students, and can find students' problems in time during the guidance process, and formulate a scientific and reasonable teaching plan. Through scientific and reasonable use of multimedia teaching methods, students can feel the charm of Analytic Geometry from multiple perspectives in a short time, thus enabling students to quickly absorb basic theoretical knowledge, deepen the understanding of knowledge and improve the quality of memory. [1]Specifically, by carrying out the online classroom teaching mode, we can realize the two-way transmission of information, use scientific and reasonable modern technical means, help students complete human-computer interaction, and comply with the teaching principle of teaching students according to their aptitude, so as to cultivate students' innovative awareness and problem-solving ability.

2.2 Implementing the teaching principle of learning with pleasure

Through the scientific and reasonable use of multimedia teaching methods, the text, voice, image and animation involved in the teaching class can be efficiently processed. Through the powerful human-computer interaction, the teacher can be assisted to develop a more scientific and reasonable classroom teaching plan for Analytic Geometry, thus creating a vivid and interesting teaching

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environment, and laying a foundation for the smooth development of the later teacher's teaching work. While reducing students' learning pressure, it can stimulate students' learning enthusiasm and initiative, in order to change the traditional and single cramming teaching method, and implement the teaching principle of learning with pleasure.

The use of multimedia teaching means can combine audio-visual and interactive functions, give play to their synergy, and create a teaching classroom that combines virtual reality environment with each other, so as to provide students with more intuitive, vivid and rich learning content, so that students can explore and discover independently in the learning environment that combines virtual reality, so as to stimulate students' learning enthusiasm, and ensure that the quality and efficiency of teaching meet the needs of today's society. Research shows that in the process of receiving knowledge, 70% will come from the transmission of vision and 30% from the transmission of hearing. The traditional cramming teaching mode cannot display the teaching content intuitively, and vividly. Through the scientific and reasonable use of multimedia teaching methods, it can transform boring and tedious theoretical knowledge into vivid images, thus improving students' learning enthusiasm and initiative. In addition, teachers' teaching pressure can also be reduced by changing the traditional standard blackboard teaching form.[2]

2.3 We can use multimedia teaching methods to introduce the idea of mathematical modeling to cultivate students' ability to solve and analyze problems

The purpose of the classroom teaching of Analytical Geometry is mainly to cultivate students' thinking of solving mathematical problems and modeling thinking. By introducing the idea of "direct generation" into the teaching class, students' ability of solving and analyzing problems can be cultivated. For example, in the teaching process of explaining that a straight line encircles a quadric surface, the teacher needs to show the students the process of infinite change, which can reflect the whole process of the straight line encircles a quadric surface. Under the traditional and single teaching method, it is impossible to show this process in a comprehensive, multi-directional and multi-level way, which makes the students have no way to deeply understand its real change process, resulting in the students cannot understand its fundamental principle. Through multimedia teaching methods, such as 3D geometric sketchpad, MATLAB, CAD, Maple and other mathematical software, the infinite change process of straight line to curved surface can be intuitively displayed, so as to implement the mathematical idea of straight line to curved surface, and accurately express the whole process of its change through vivid, rich and diverse animation. Students can more deeply understand the basic concepts of mathematical theoretical knowledge, and train their mathematical thinking and modeling thinking step by step.

3. Principles of multimedia teaching application

3.1 Purposive principle

In the process of using multimedia teaching methods to improve the teaching level and quality of Analytical Geometry, teachers should also be the main body of teaching in the classroom, and teachers should be the important factor of transformation, and mathematical theoretical knowledge should be vividly displayed to students through multimedia technology. If multimedia teaching is directly used to replace the role of teachers, it will not play a positive role in multimedia teaching. For remote and poverty-stricken areas, online teaching can be used to assist students to further complete the learning of teaching theoretical knowledge, while in other teaching environments, multimedia teaching equipment can only be used as a helper for teachers in the classroom, not completely replace the positive role of teachers in the classroom.

3.2 Interactive function

In the process of making multimedia teaching courseware, we should use the courseware flexibly and variously according to the different teaching characteristics of different classrooms. For example, in the process of explaining the cube teaching knowledge, some teachers will use the isometric projection, and some teachers will use the positive second measurement. Therefore, in the process of making multimedia courseware, we should combine the teachers' habit of using software, and show the teaching content to students according to their own teaching characteristics. At the same time, for the cube teaching class, teachers should select the corner of the cube about the three coordinate axes

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according to their own teaching content and teaching habits, so as to develop more scientific and reasonable multimedia teaching courseware. In this process, teachers can also better interact with courseware content by adding graphics, colors and text descriptions.

3.3 Teaching content of animation

In the process of adding animation to multimedia teaching courseware, teachers should ensure that the graphics have accuracy and reliability. Whether the graphics are rotated or translated, they should ensure that the animation displayed is accurate. For example, the result of the vertical line of the space reflected on the projection is not necessarily vertical. Under the traditional teaching mode, the teacher can only draw on the blackboard and simply show the above process to the students. The graphics are not accurate and reliable. However, the plane rotation and the actual position of the projection plane can be intuitively shown to the students through scientific and reasonable use of CAI courseware or Maple teaching software. This will enable students to understand mathematical knowledge more deeply, and further show students mathematical transformation formulas by ensuring the accuracy of graphic changes and graphic change results.

4. The role of multimedia technology in the construction of high-quality class of Analytical Geometry

4.1 Application of Maple drawing software

Maple is a relatively advanced teaching software package at present. It can provide teachers with more convenient and fast mathematics teaching content through a good use environment, accurate symbol calculation, and numerical calculation, flexible image display, and efficient editing function, so as to improve the teaching level and quality of Analytical Geometry. Maple drawing software has high efficiency and flexibility, and its generated graphics have accuracy and reliability, and can also be flexibly pasted into windows applications.

4.2 Changing from static to dynamic

The classroom teaching of Analytic Geometry mainly studies the problems of space geometry through algebra. In the teaching process, it will involve more complex and diverse teaching graphics, such as saddle surface and its sub-generatrix, hyperboloid of two leaves, etc. Under the traditional teaching method, the teaching work is mainly carried out by taking the teacher's explanation as the main content and taking the teaching textbook as the basic content. Its teaching method is relatively backward. At the same time, a large number of figures involved in Analytic Geometry can only be presented on the blackboard in a static way, which cannot vividly show the dynamic process of image changes, thus affecting the extent to which students absorb teaching knowledge. Through scientific and reasonable use of multimedia teaching methods, students can display clear and dynamic visual effects, thus improving the degree of students' absorption of knowledge, and ensuring that the teaching quality and efficiency meet the current actual teaching needs.

4.3 Changing from passive to active

Because the teaching class of Analytical Geometry is scientific, it is also necessary to summarize the teaching content. Therefore, in the course of explaining Analytical Geometry, teachers should also explain the scientific knowledge of induction in the process of explaining the basic theoretical knowledge of teaching, and have higher requirements for students. Through the scientific and reasonable introduction of multimedia teaching methods, we can innovate and optimize the traditional teaching methods, let students become the main body of the teaching class, make students become active from passive, and really become the takers of classroom knowledge, so as to cultivate students' observation and analysis ability. For example, in the class of explaining the sphere of three points on a straight line, the teacher can intuitively show the different spheres to the students through multimedia technology, let the students observe the position of the center of the ball, so that the students can understand that the center of the ball is on a vertical line perpendicular to the plane of the triangle, and then guide the students to diverge. Through real and vivid case demonstration, students can intuitively learn abstract theoretical knowledge through the process of graphic change, thus improving their learning enthusiasm and initiative.

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5. The specific implementation plan for the construction of the high-quality class of Analytical Geometry

5.1 Changing teaching concept

The traditional teaching mode is mainly based on teachers' explanation and students' listening, and its teaching purpose is mainly to impart textbook knowledge. Under the current situation, the traditional teaching mode has been unable to meet the actual needs of higher education in China, and the talents cultivated do not meet the actual social requirements. In view of the above, colleges and universities should change the traditional teaching concepts and teaching methods, and cultivate students' logical thinking ability, spatial imagination ability, mathematical thinking and modeling thinking through the introduction of advanced multimedia teaching methods, so as to cultivate a batch of innovative and comprehensive talents for the development of our society.

5.2 Reforming and optimizing the traditional teaching content

Reforming and optimizing the traditional teaching content can ensure the improvement of teaching quality and level. Therefore, colleges and universities should innovate and optimize the traditional teaching content, implement the teaching concept of teaching students according to their aptitude through multimedia teaching methods, and create a high-quality class of Analytical Geometry. At the same time, in view of the problems existing in the textbook of Analytical Geometry, we should innovate and optimize the teaching content in time, and re-integrate the existing teaching content, so as to establish and improve the classroom teaching system based on multimedia teaching methods. The existing teaching content can be innovated from the following aspects.

5.2.1 Infiltration of mathematical model thought

By combining the teaching content of Analytic Geometry with the mathematical problems in real life, we can build a mathematical model and infiltrate the idea of mathematical model by way of example, so that students can apply the teaching knowledge of Analytic Geometry to practice, and then cultivate students' logical thinking ability of Analytic Geometry.

5.2.2 Scientific and reasonable application of mathematical software

Through scientific and rational use of mathematical software, the quality and level of the teaching class of Analytical Geometry can be improved. For example, colleges and universities can use mathematical mapping software such as Matlab and Maple in the teaching class of Analytical Geometry, so as to make the teaching content more vivid, rich and diverse, and thus attract students' learning enthusiasm and initiative.

5.2.3 Improving teaching methods

Under the traditional teaching mode, the teacher is mainly responsible for the fixed class. Due to the limited time of the teacher, the interaction with the students cannot be increased through the traditional teaching mode of explanation, which leads to the students' lack of learning enthusiasm and initiative, and the problems encountered by the students in the learning process cannot be effectively solved and fed back. Therefore, we can innovate and optimize the traditional teaching methods, adopt the heuristic guidance teaching method and combine the multimedia teaching methods to innovate and optimize the current teaching content and teaching methods, so as to establish a sound, unified and standardized new classroom teaching system. In this process, we should change the traditional teaching plan, adhere to the student-oriented teaching concept, develop a people-oriented teaching strategy, and actively introduce advanced heuristic teaching methods by innovating the traditional cramming teaching method, in order to transform teachers into guides in the process of students' learning, help students discover and update knowledge, and cultivate students' ability to learn independently. In addition, teachers should make multimedia teaching courseware, combine the teaching concept of teaching students according to their aptitude, and integrate images, words, sounds, and animation into the teaching classroom, so as to vividly display the teaching content of Analytical Geometry in the teaching classroom.

6. Conclusion

In the process of building the high-quality class of Analytical Geometry, we should combine the

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teaching characteristics of the analytical course and the level of teachers in colleges and universities, select more scientific and reasonable teaching software, and develop high-quality teaching courseware, so as to play a positive role in multimedia teaching and improve the level and quality of classroom teaching of Analytical Geometry.

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References

[1] Hua M, Chen Q. On the role of multimedia technology in the construction of high-quality course of Analytical Geometry [J]. China Science and Education Innovation Guide 2009; (34):1.
[2] Chen Y. The design idea of the network course of dynamic advanced algebra and space Analytic Geometry [J]. School Park 2014; 000(007):77-77.