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Discussion and Practice of Bilingual Teaching of Spatial Analytic Geometry

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***Abstract*:** As a basic course of college mathematics and applied mathematics. Spatial Analytic Geometry provides a basic premise for mathematics majors to carry out in-depth learning. At present, with the gradual deepening of educational reform, university curriculum teaching has begun to integrate with the world's international teaching. Colleges and universities have introduced the Sino foreign cooperative school running platform into the classroom, improved the traditional teaching mode of spatial analytic geometry while launching bilingual teaching curriculum activities, and sought an education and teaching mode more suitable for college students in the new era. Exploring and practicing the bilingual teaching of Spatial Analytic Geometry is the curriculum reform of practicing "three complete education", opening up space and road for curriculum innovation and development, and the teaching practice focusing on the future development of students.

***Keywords*:** Spatial Analytic Geometry Course; Bilingual Teaching; Discussion and Practice

1. Introduction

At present, most universities have majors set up in cooperation with foreign countries, so that colleges and universities in various countries can exchange and study the professional knowledge of a major and maximize resources. The Chinese Textbooks of Spatial Analytic Geometry are translated and compiled based on the original English textbook. The symbols in the book are English abbreviations or Latin. If you understand the professional English of Spatial Analytic Geometry, you will have a clearer understanding and more natural understanding of the mathematical symbols in the textbook. On the other hand, mathematical symbolic software such as MATLAB, MAPLE, MATHEMATICA etc., often use the full name or abbreviation of mathematical proper nouns in programming and operation, and these software can help us learn the course of Spatial Analytic Geometry. Therefore, it is necessary to carry out bilingual teaching of Spatial Analytic Geometry. This paper describes the development and practice of bilingual teaching of spatial analytic geometry.

2. Current teaching situation of Spatial Analytic Geometry

2.1 The single teaching mode leads to the inconspicuous learning effect

College mathematics courses have relatively high requirements for students' logical thinking ability and problem derivation ability. The traditional teaching of Spatial Analytic Geometry focuses on teachers' imparting knowledge, while ignoring the cultivation of students' innovative and practical ability. The classroom teaching reform and innovation of Spatial Analytic Geometry is few, and it is also limited to the display of PPT courseware or model teaching aids, without highlighting the characteristics of this course. However, students are in the situation of passive learning, and their interest in learning has not been stimulated, resulting in no obvious learning effect.

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2.2 Students do not have a deep understanding of the course content and lack independent thinking

The course of Spatial Analytic Geometry for mathematics majors contains a lot of mathematical ideas and theoretical knowledge, especially when learning spatial geometry requires students to have strong spatial imagination. Therefore, learning this course is very difficult. Manymathematical symbols in the textbook of Spatial Analytic Geometry come from the abbreviations or initials of English words. For example, projection is generally recorded as project, which is actually the abbreviation of projection, and straight lines are often represented by the English letter l because of the word line. In traditional teaching, students just memorize by rote and remember these slightly stiff symbols, which is not conducive to students' overall thinking of mathematics course learning, so that some students said they had a headache when they saw these symbols.

2.3 Forming a fixed thinking and cannot skillfully using relevant teaching aids

The study of Spatial Analytic Geometry should focus on cultivating students' spatial imagination ability. Now there are many mathematical software that can make graphics concrete through programming and drawing, so as to better cultivate students' spatial imagination ability. However, due to the lack of bilingual learning of mathematics professional vocabulary, students often can't find appropriate commands to realize their ideas when programming with software, or memorize these astringent commands. In fact, the commands that these students feel headache are only abbreviations of English words, such as the command to solve equations is solve, the command to draw pictures is plot, and so on.

3. The necessity of bilingual teaching of Spatial Analytic Geometry

Under the guidance of the student-oriented "three complete education" thought, the traditional teaching mode of Spatial Analytic Geometry urgently needs teaching reform. The implementation of bilingual teaching is a good opportunity for the input reform of the traditional teaching mode. Carrying out bilingual course is to achieve the goal of all-round education through curriculum reform. First of all, bilingual teaching can make students transition from learning English to learning in English. Some college students feel that learning English is useless and fail to stimulate students' subjective initiative in learning, resulting in students' weak foundation of English and weak oral English. In the classroom of bilingual teaching, students use English to learn mathematical knowledge and have more opportunities to communicate and discuss geometric problems. Students realize from the process of learning that the efforts made in English for many years are useful and imperceptibly improve students' English learning ability. At the same time, many mathematical symbols in the textbook of Spatial Analytic Geometry come from the abbreviations or initials of English words. After learning professional vocabulary, students broaden their horizons, better understand concepts, remember expression forms, and construct the overall thinking of this course, so as to achieve the purpose of high-quality and effective teaching. Finally, the cultivation of innovative talents is inseparable from computer programming. Now there are many mathematical software that can make graphics concrete through programming and drawing to better cultivate students' spatial imagination ability. Programming can also solve the example exercises in Spatial Analytic Geometry, and even prove the important theorems of analytic geometry. The commands in the programmed implementation of spatial analytic geometry are English proper terms in geometry class. Students who have taken the bilingual course of spatial analytic geometry can easily remember the English commands of various geometric operations and complete the programming quickly, so that they can accept new knowledge in a more flexible and innovative way when learning mathematics.

4. Practical methods of bilingual teaching of Spatial Analytic Geometry

4.1 Improving the use of students' textbooks in bilingual teaching classroom

Teaching materials are an important basis for guiding students' learning. Therefore, teachers should consider the scope of application and content quality of teaching materials when choosingteaching materials. The original foreign English textbooks are used in the bilingual teaching of Spatial Analytic Geometry. In order to help students better understand the learning content, teachers should recommend the corresponding Chinese teaching aids. Secondly, the bilingual teaching of Spatial Analytic Geometry should adjust the course content of the original English textbook according to the content of the domestic mainstream Chinese textbook. For example, taking Spatial Analytic Geometry as an example, in the original foreign textbooks, there are less theoretical analysis and more applied topic training, which is quite different from the content of domestic college students' mathematics competition, and can not fully adapt to the teaching objectives of domestic college students. Therefore, in order to ensure that the content is consistent with the teaching outline, it is necessary to appropriately adjust, add or delete the content of the original textbooks. Students gain an international perspective in bilingual classroom.

4.2 Putting forward new requirements for students' after-school homework and helping students adapt to the new teaching mode

Bilingual teaching classroom is participatory and innovative. In order to fully continue the autonomy and innovation of the classroom, it is required to change the form of students' homework after class. In the classroom, we should set up an interactive question time to ask questions between students, teachers and students to solve the remaining problems; After class, students are required to review and preview Chinese and English with supporting teaching materials in their spare time, and make full use of their independent learning time after class by doing English math homework. After class, students form study groups and use oral English practice to explain homework after class, so as to exercise students' expression ability and English application ability. After a semester of course study, it can effectively cultivate students' independent innovation ability and learning ability.

4.3 Reforming the examination method of analytic geometry and incorporating the use of software into the course examination of analytic geometry

Because Maple's drawing programming is very easy to learn, students can observe various three-dimensional graphics through programming after class, and even add a certain animation effect, so as to make the abstract three-dimensional spatial graphics become concrete and vivid, improve students' interest in learning and stimulate their own motivation for learning. We should reform the existing assessment methods, while paying attention to students' understanding and mastery of basic knowledge, basic concepts and conclusions, so that we can test students' flexible use of knowledge. In the process of hands-on operation, students actively use maple software to analyze various graphics, strengthen the understanding and application of mathematics professional vocabulary learned in bilingual classroom, and have both theory and practice, in order to cultivate students' enthusiasm and creativity, and improve teaching effect.

5. Conclusion

In a word, the main purpose of bilingual teaching of Spatial Analytic Geometry is to comprehensively cultivate students' learning ability, broaden students' horizons, and achieve the teaching effect of improving students' professional ability and oral expression ability. Of course, bilingual teaching is also a good platform to improve teachers' professional ability in teaching and scientific research. In the application environment of professional English, teachers and students interact effectively, which stimulates teachers' awareness of improving themselves and absorbing new research achievements in the frontier fields of relevant disciplines.

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