

Bilingual Teaching on Advanced Mathematics

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Abstract

with progressive development of innovation and technology, education in higher college should keep up with the step of times development, the bilingual teaching of advanced mathematics is just the best choice for students to grasp mathematics knowledge and simultaneously to improve English skills, and it will be an important link in improving the quality of the entire Chinese nation. Through the bilingual teaching practice, the authors put emphasis on the important role of bilingual teaching in advanced mathematics, and further raised strategies in how to improve university students' comprehensive ability based on bilingual teaching of advanced mathematics.

Index Terms: bilingual teaching; bilingual English corner; bilingual practice; bilingual team

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1. Introduction

Mathematics as a technology science is gotten more attention by various industries in such a knowledge-based economy era, so mathematics teaching in university turns out to aim at training students' mathematical quality. The bilingual teaching in advanced mathematics is our university's boldness attempt, which makes us more aware that it is a long project that we should conduct our thoroughgoing and painstaking bit by bit; only in this manner can we acquire more experience so as to promote the progressive development of advanced mathematics bilingual teaching. "Bilingual Teaching" that consists of "bilingual" and "teach" is a special teaching method using two languages at the same time [1]. The aim is to make the Chinese students first and foremost learn the professional knowledge in the use of Chinese and meanwhile cultivate four important English techniques in learning, speaking, reading and writing and finally achieve the goal of mastering professional knowledge and improving English proficiency together. Therefore, bilingual teaching in advanced mathematics plays an important role in straightening students' comprehensive ability.

2. Bilingual Teaching

Bilingual teaching can be carried out smoothly requires the teachers and students to clear the bilingual teaching objective, contents and also grasp good teaching method. Hence, to enable teachers and students to

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understand clearly about the bilingual teaching, the bilingual teaching should make a breakthrough in the following areas:

1) Target: Put mathematics knowledge to be the main goal, compulsively create English environment, and then let student master professional knowledge of mathematics and meanwhile gradually improve English listening, reading, speaking and writing all these crucial abilities in such an English environment [2].

2) Approach: Teaching mainly with English textbook and compulsively with the Chinese one; writing mainly in English on the chalkboard and explaining in Chinese. When we introduce the new knowledge, we suggest student pay more attention to new nouns and key words of the law to shorten the time of presentation and simultaneously point students where the most important point is. In class, application exercise is also quite necessary, though which students can solve problems in time; meanwhile, students are encouraged to express their own views on a timely discussion so as to improve English skills swiftly. Of course we also provide famous English phrases, like "If you cherish your feather very much and avoid any injury, you will lose your two plumages, and they cannot fly in the sky anymore", to arouse students' interest in English and Mathematics learning as well as enhance their vigor and strength.

3) Demand: Do more speaking and math problems practice in class; do exercise carefully after class, and further consolidate mathematics knowledge, logic power and improve written English.

3. Practice on Higher Mathematics Bilingual Teaching

After one and a half year of bilingual teaching in advanced mathematics, we actively carry out study on teaching and application, through which we deep figure out that the key in bilingual teaching lies in developing students' capability to receive both specialized knowledge and English skills.

3.1 Characteristics of Bilingual Teaching in Advanced Mathematics

The bilingual teaching in advanced mathematics has certain bilingual teaching materials, which is translated by our own teachers according to text we wrote for students in different majors, and in class teaching mainly with English textbook and compulsively with the Chinese one; writing mainly in English on the chalkboard and explaining in Chinese. Besides, the method is quite flexible:

1) English spirit phrases "One day, one word", for instance, "In life as in a football game, the main principle is to hit the line hard". In such a manner, it can fully arouse students' interest in learning mathematics and English both and it also have a good function in making students firm their faith hardly.

2) Explain the contents "simple and precise", to help students master knowledge well in various sections, and to encourage students to express views with their own words so as to train students ability in English speaking and therefore guide them to learn by themselves;

3) Develop the "bilingual English corner", that is give students more opportunities to think of problems with respect to a certain subject, though discussions and representatives in class, students obtain much boldness and courage in analyzing and explaining all kind of problems;

4) "Combat in class", which means to let students play the main role in the class stage to solve problems on blackboard and explain it to others, through which the universal problem become plainly visible and students can easily find their own problems, correspondingly, there will be a more profound understanding and the problems may be solved out soon, the achievement in such a manner is scored into the usual result.

3.2 The Perfect Combination of Mathematics and English

The main characteristic of the mathematics curriculum is that it contains more contents, more formulas and more knowledge, where many students' response has only one word "difficult", so the mathematics curriculum itself that make so many students fierce seemed to be even harder to apply bilingual teaching. Therefore, whether the course content arrangement is reasonable or not, directly decides if the bilingual teaching can be carried out smoothly in advanced mathematics, and development is good and bad. Through the bilingual teaching practice of mathematics curriculum, we strongly figure out the unique charm of English in advanced mathematics course.

1) "Three lines" in advanced mathematics, the scope of "function with one variable or two", four principal knowledge "limit-continuity-derivative-integral" and main contents "definition-property-judgment-calculation-application", then the whole material is developed surrounding the three main lines, in which manner the coherence become more distinct;

2) Technique as "bilingual comparing method" is an approach that denotes remembering similar mathematics knowledge with the help of English words. As we know, in English we can imagine special situations to those similar words having the same pronunciation and spelling but different meanings or words having different spelling, different meaning but the same pronunciation, so to these mathematics concepts against each other or problems with the same type, we fully consider the excellent combination between Chinese and English and suggest student writing out the similar points and the different points together, then make a comparison among all these points. For instance, in advanced mathematics there is a pair of concept like "monotone increasing and monotone decreasing", "convergent and divergent" and "bounded and unbounded" and so on, by contrast, mathematics and English the two types of knowledge get a perfect union, and the knowledge is clearly passed to students, in which manner more and more students mastered mathematics knowledge firmly as well as remember a multitude of English words, it can be seen as a very good approach in creating better atmosphere for bilingual education and in fully arousing the students' attention to the bilingual teaching;

3) Among knowledge, to understand the new concept, the "shape combined method", "image comparisons" both play key roles in inducing the envision ability of thinking and space imagination, for example, the surfaces graphics in function space have decisive role in multi-function calculus, which is essential to space imagination. So on the content of explanation, we encourage students to develop associations and imagination, through imaging object such as the skin of the ball and the watermelon or the ice cream tube to express the space surface, with a single object, students have more profound awareness on the space surface that is supposed to be hard to imagine, in this way, they practice their thinking sufficiently; simultaneously, students inadvertently master a lot of English words in life ;

4) Make summary in each chapter. To students' distinct level in acceptance, we provide distinct instruction. Through communication, we continue to examine and correct our own merits and make the bilingual teaching for the better carrying out. To homework, we always encourage students to use their own familiar English sentences and suggest them doing section summaries, through which they understand the principal knowledge timely and improve their written English abilities as well, which is not merely conducive to help students know where knowledge points are linked, also help them understand the English context comprehensively. Therefore, the multi-language mathematics thinking ability and capacity in solving problems are both developed, and then the bilingual teaching purpose is reached.

3.3 Bilingual Team in Advanced Mathematics

The bilingual teaching in advanced mathematics should build an associated bilingual team. The "Bilingual team" is composed of teachers and students, all team members must always bear in mind the bilingual team culture that is, dare to imagine, dare to speak and dare to write. To win in the advanced mathematics bilingual teaching, a good cooperated language environment is of great demand; teachers and students through cooperation should promote the atmosphere in our classroom, which can help students in training coordination capacity and activity in study. Through teaching cooperation, students feel deep their own interaction and the teaching effect so that their ambitious in learning both mathematics and English knowledge is inspired, through which students also establish a strong team consciousness that is more conducive to cultivate a good personality

in dealing with relationships with the group members and some others. Therefore, in bilingual teaching, bilingual team consciousness will be more helpful for students' group spirit development [3].

4. Outlook on Higher Mathematics Bilingual Teaching

Standing in the 21st century in science and technology, talents in highly quality and capability of various knowledge is fiercely required to our country's progressive development, they are the backbone and lifeline resource for our society's progress and the bilingual teaching is just looking forward to realize it. Therefore, it turned out that our higher education shall confront with enormous challenges in fostering excellence with both knowledge and special abilities so as to adapt to the socialism modernization.

The national research council in a report illustrates that mathematics, energy and materials three courses should be given priority to develop. "Advanced Mathematics" plays a very crucial role in modern science and technology, culture, social, economic and national defense and so on, and the special status is indispensable. Through mathematics leaning, the point we see problems, the organization we handle and the rigor we think problems, the mind, spirit and methods in solving problems, all are greatly promoted, which is actually essential to people comprehensive quality, particularly in innovative capacity and innovative quality [4]. With the increasingly globalized world economy nowadays, "bilingual talent" in both English skills and professional knowledge will be the most important resource in our society.

Therefore, bilingual teaching on advanced mathematics is the best choice to foster students grasping mathematics knowledge and improving English skills both, we as the bilingual teachers are delighted to welcome this bran-new development opportunity.

5. Conclusions

The bilingual teaching gives us chances to continue to challenge and enrich ourselves, from which we also found where we are still short of. Therefore, in the subsequent new academic year, we will involve ourselves into exploring the new teaching method to better inspire students' great interest in the new course so as to lay solid foundation for their future development.

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