
The Innovative Study of the Function of Bilingual Teaching in Cultivating Professional Talents of Mineral Processing Engineering

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Abstract: Cultivating bilingual talents is the demand of the development of higher education internationalization. Bilingual teaching is a significant measure of China's higher education reform under the new situation. Mineral processing engineering is an important research direction in mining engineering discipline and plays an important role in cultivating technical talents of mining engineering and scientific research. From the characteristics background and target of mineral processing engineering in our school, this paper combines selection of teaching materials, teaching methods and evaluation index etc. and discuss the application of bilingual teaching in cultivating professional talents of mineral processing engineering.

Keywords: Bilingual Teaching, Cultivating Talents, Mineral Processing Engineering

1. Introduction

Bilingual teaching is an important measure to implement undergraduate education and teaching in our country in order to keep up our country's higher education with the time demanding and cultivate internationalized talents. With the rapid development of high and new science and technology and the increasingly intimate of the global international communication, the demand for bilingual talents is increasing constantly in China. With the rapid development of modern science and technology, modern industry has put forward higher requirements for the knowledge, ability and quality of engineering and technical personnel [1]. In the new situation of prosperous development in coal washing and processing industry in China, higher engineering school must achieve three structural characteristics of knowledge, ability and quality in the field of cultivating talents. Especially in the perspective of economic globalization, the students must not only have the spirit of exploration and innovation, but also have the ability of international cooperation and competition in order to make college students a difference after graduation. At present, colleges and universities are actively promoting the use of English and other foreign language teaching of public and professional courses in order to cultivate high

quality and interdisciplinary talents through bilingual teaching. In order to cultivate mineral processing engineering professional talents who can adapt to the society and rapid economic development, we have carried out bilingual teaching reform on the courses of mineral processing.

With the coming of the world economy development tide, the rate of economic development of our country is amazing in recent years, while maintaining rapid economic development requires a large number of professional and technical talents, such interdisciplinary, innovative and international senior talents require not only to master the professional knowledge, but also be good at the professional foreign language. In order to cultivate such high level talents, it is particularly important for the bilingual teaching in curriculum setting in college. For the students of mineral processing engineering, they are also facing the problem of international reform and innovation in mineral processing engineering. The *new progress in mineral processing* is a compulsory course for the major of mineral processing in our school, and it has a very important and far-reaching significance for establishing *new progress in mineral processing* bilingual course system to the construction of professional courses. [2]

2. Background and Objectives of Mineral Processing Engineering

China University of Mining and Technology (Beijing) is a comprehensive university based on science and Engineering, and is the key university of domestic coal field cultivating talents, and for many years, it has sent a large number of outstanding technical talents and management talents for large coal enterprises. In recent years, with the prosperous development of the coal industry, the increasing number of foreign investment in the coal field and foreign development of China's coal industry, it is particularly necessary to cultivate international interdisciplinary talents with solid professional knowledge of mineral processing and communication in English. In addition, with the continuous enrichment and development of Chinese and foreign cooperation in running schools, how to make the traditional courses and foreign courses successfully docking, we must strengthen the role of bilingual teaching. According to the purpose of our school "build school into an important influencing, multidisciplinary, research-based and open high level university", we need to internationalize the level of education and mode of cultivating talents in order to achieve this goal. It is the necessary measure and guarantee for the implementation of bilingual teaching to realize this goal, and it is an important measure to improve the international competitive ability of the students. It will play an important role in promoting China's higher education to reach the international advanced level and realizing the internationalization of higher education, especially the characteristic education of coal chemical industry [3-5].

According to our national conditions, bilingual teaching can be divided into three levels. First, it is the simple penetration, that is, teachers use English to express the common language of the course and the important nouns etc. in the teaching process. Second, it is the bilingual integration, that is, teachers use English and Chinese alternately in the course of teaching, so that students learn to use English to express Chinese content. Third, it is the bilingual thinking, that is, students can learn to think and solve problems in their native language and foreign language at the same time through bilingual teaching. For the bilingual teaching in colleges and universities, the author thinks that it should be based on the second levels of bilingual teaching, teachers should focus on cultivating the students' ability to read the original English materials and write in English, so as to meet the needs of future development. [6].

Course objectives, also known as training objectives, constitute the first element of the curriculum content, refers to the curriculum to achieve the expected level, which includes both quantitative and qualitative requirements. There are three aspects for course objectives: 1) The object of the target is the student, not teachers or textbook editors; Teachers are the motivators of curriculum objectives. 2) The goal is to achieve the final results, rather than refers to the process of development and change or the process of student experience. 3) curriculum objectives are hierarchical and category. The goal of the course design, not only to reflect the reasonable

value orientation, but also handle the internal structure of the curriculum objectives of the hierarchical relationship. The value orientation of the course goal is to deal with the relationship between tradition and modernity, internationalization and localization according to the new demand of the new situation, and to design the course goal in inheriting and reforming and innovating. The goal of the course design should pay attention to the internal structure of the hierarchy and integrity. It is necessary to strengthen the humanities and scientific literacy, but also take into account the requirements both from quality and quantity goals.

As bilingual teaching breaks the single teaching standard of teaching in mother tongue or foreign language, it requires the establishment of a "big curriculum view of bilingual education", which should focus on the improvement of students' ability of thinking in two aspects. Therefore, the overall goal of bilingual teaching in institutions of higher learning should be: it is based on the professional teaching, purposed for organic integration between professional requirements and language skills, to train high-quality professionals who are capably adapt to complex international competition. It is required two aspects: Firstly, it is required to master the professional knowledge in system and to own the literacy and ability corresponding to his professional degree. Secondly, it is required to has the ability to use foreign language to do the professional work, which includes reading ability for professional literature, basic professional writing ability, professional translation skills and professional listening and speaking ability. The two aspects complement each other and are indispensable.

3. Difficulties and Solutions in the Implementation of Bilingual Teaching

The so-called "bilingual teaching", refers to the use of two language teaching activities. It requires the use of correct and fluent foreign language (mainly in English) to explain some or all of the teaching, but does not rule out the Chinese language, avoids the students' thinking obstacles due to language delay. In this way, the ultimate goal is that learners are able to use both the native language and the non-native language (usually English) and freely switch between the two languages according to the needs of communication object and work environment, expand the multi-level, effective language practice space, enrich students' language knowledge, further develop their ability to think in English and become international talents who know both profession and foreign languages. [7].

Carrying out bilingual teaching is to use two languages as the medium of teaching and achieve dual teaching purpose of mastery of professional knowledge and enhancing the ability of English through the study of professional knowledge. The ultimate goal of bilingual teaching in universities should also enable learners to use both native language and English thinking, and be able to freely switch between the two languages according to the needs of communication object

and work environment. [8] However, there are many practical problems in the process of bilingual teaching in the absence of English language environment, which makes it difficult to communicate and interact with each other.

3.1. The Aspect of Teaching Materials

The teaching materials play an important role in teaching. Students can grasp the professional knowledge of the discipline by reading the textbook under the guidance of the teacher. For Chinese students, it is very easy to find the Chinese version of the teaching materials for the native language teaching, while it is very difficult to have a foreign language teaching materials for the bilingual teaching. In fact, even in the developed countries, not everyone has the teaching materials. Due to the high price, the purchase of teaching materials is entirely voluntary behavior of students, and foreign original teaching materials for Chinese students, although the scientific, systematic and coherent are guaranteed, the language is relatively difficult for undergraduate students and the teaching materials content is too professional[9]. In particular, there are very few teaching materials can really be used as the undergraduate mineral processing talents cultivating. They want to teach bilingual courses well for teachers, but there is no one in line with China's mineral processing cultivating talents syllabus and excellent English teaching materials. Therefore, the teachers in our school compile lecture sheets in themselves based on the reference of the excellent original textbooks, the latest research works and the high quality Chinese textbooks, and organize the high level of English teachers to check the language. In this way, it can not only control the difficulty of the teaching materials according to the actual situation of the students, but also select the teaching contents according to the characteristics of the mineral processing. At the same time, teachers should pay attention to broaden students' horizons, take into account the practicality and advance of teaching materials and give students space to study after class to make up for the loss of some of the poor English in class, and try to make different levels of students adapt to bilingual teaching. At present, the implementation of bilingual teaching is only in the *new progress in mineral processing* on account of bilingual teaching starting late in professional course in our school. Teachers grasp fuzzy on the bilingual proportion and teaching objectives are not clear. This situation has a negative impact on the smooth development of bilingual teaching. Therefore, we will further improve the system of students' professional knowledge structure by improving the syllabus of bilingual teaching, clarifying the teaching objectives, establishing the proportion of bilingual teaching and making bilingual teaching carried out in a reasonable and orderly way.

3.2. The Aspect of Teaching Forms

Language is just a teaching method and students should master the discipline knowledge in bilingual teaching. However, it is a challenge for both teachers and students in the process of the specific implementation of bilingual teaching

due to the introduction of the second language. Teachers should adopt an appropriate proportion of English to teach in order to enable students to improve their language and knowledge in the face of the uneven English level among students. If the proportion of English teaching is too small, the students' professional foreign language vocabulary cannot be expanded and the way of thinking cannot be well matched with foreign language teaching materials. While the proportion of English teaching is too high, students will focus on the language excessively and lead to neglect the professional knowledge, resulting in a decline in the quality of teaching. In teaching practice, how to balance the contradiction between teaching language and discipline teaching needs to be explored constantly. In addition, the purpose of bilingual teaching is to enable the students to understand the development of the discipline in an international perspective. Therefore, we should break through the traditional Chinese indoctrination education on the teaching means and methods. But at present, students are not clear about the goal of professional English learning and lack positivity, and lead to too little interaction between teachers and students in process of enlightening and guiding instruction in class because of the students little respond to the teachers. In addition, the discipline frontier knowledge itself is more profound and novel, teachers is rather obscure using English in class. It is difficult for students to understand and students also lost interest invisibly in class. It will be more vivid to learn by combining modern teaching equipment, using PPT combined with video, pictures and text, and students will be easy to increase interest, thus achieve good teaching results.

In the course of *new progress in mineral processing*, teachers discuss the five major aspects of mineral processing engineering in the period of 5 hours (crushing, screening, gravity separation, flotation, solid-liquid separation). Then students divide into several learning discussion groups, collect the advanced technology at home and abroad in recent three years, make PPT in English, use Chinese and English to express and to communicate with other students, other students can also ask questions, but can only use English to put forward. Students fully mobilize their positivity with this kind of discussion, and students can expand and consolidate their professional knowledge in the process of discussing and learning.

3.3. Evaluating Indicator

Bilingual teaching evaluation can be divided into two aspects: the evaluation of implementation conditions of bilingual teaching evaluation and the evaluation of classroom teaching effect. The teaching implementation conditions include teachers' professional quality, students' quality and so on. According to the above constraints to clarify that there are still many aspects to be improved in the implementation of bilingual teaching at present. Because of these problems, it is difficult to establish the evaluation system. For example, the evaluation of bilingual teaching on teachers' professional level includes professional quality, comprehensive teaching ability, foreign language ability, educational technology and other

indicators. At present, the teachers who are good at bilingual English and rich industry experience, solid professional knowledge and skills of the course are very rare in regular higher educational institutions. The lack of excellent bilingual teachers restricts the popularization of bilingual teaching to some extent in regular higher educational institutions and leads to the lower teaching evaluation of the teaching staff and the evaluation standard is difficult to improve. In addition, from the quality of the students, the majority of College Students' foreign language level is uneven, especially the weak listening and speaking ability. As the main body in the process of bilingual education, the students' language ability and learning attitude have an important influence on bilingual teaching. It is necessary to evaluate the students' professional quality, foreign language ability, and the positivity of bilingual learning. The evaluation of class teaching effect is also an important aspect in the evaluation of bilingual teaching, including teaching contents, teaching attitude and teaching methods and so on.

The bilingual education is based on students' good mastery of professional knowledge. Bilingual teaching not only has high requirements on capacity of teachers, but also on English level of students. A key university in China has conducted a survey on bilingual teaching, and found that only 20% of the students said bilingual teaching is easy to learn and can receive good results from it; 50% of the students said that bilingual teaching course is seemed not so hard, but it is difficult to be fully understood; the rest of said that bilingual lesson is very difficult, or even cannot be understood totally [10]. The professionalism of mineral processing is very strong, and involved in a lot of professional words. A large part of students cannot accurately understand professional words, leading to the drop of learning interest.

Whether the bilingual teaching has achieved the desired results or not, it is proved feasible if the bilingual teaching has the desired results. Whether bilingual teaching will affect the learning of discipline knowledge and the development of students' cognitive thinking also need bilingual teaching experts to pay attention. At the same time, it is the direct goal of bilingual teaching to improve students' comprehensive ability of using English. Thus students' academic and English abilities must be evaluated at the end of the bilingual course. Bilingual teaching in Colleges and universities is to meet the needs of society and cultivate the interdisciplinary coal chemical industry technical talents who can master foreign language. Therefore, we should evaluate the effect of bilingual teaching from the perspective of social value in colleges and universities. It is also the important indicator of bilingual teaching in colleges and universities from the perspective of whether the graduates of bilingual teaching show more advantages than those who do not participate in bilingual teaching in the later job wanted and career development, whether they can meet the requirements of employers and adapt to the society.

3.4. Innovative Education and Education Innovation

The so-called innovative education is to give the

characteristics of human innovation activities to the whole process of education. Based on it, the aim to cultivate innovative talents and achieve the comprehensive development of human can be achieved. Innovative education is an important part of quality education. The basic value orientations are to cultivate people's innovative consciousness, innovative spirit and innovative ability, which is the basic way for the country to realize the prosperity of science and education. In recent years, many colleges and universities have carried out beneficial exploration and practice on innovative education, especially in the teaching concept, bilingual teaching is a very useful exploration and attempt to innovation education. Bilingual teaching refers to the teaching of non-linguistic subjects used two different languages. In fact, bilingualism is the use of two languages for individual in daily life, work and study. Bilingual teaching in foreign countries has been adopted for a long time. The bilingual teaching in foreign countries is mainly from racial assimilation or multicultural needs. From the implementation of bilingual teaching, the most common modes include:

(1) Immersion mode. The school uses a language that is different from the language used by students at home, and all courses and instructional languages use the second language.

(2) Retention mode. Students use their mother tongue at the beginning of school, and then gradually use foreign language in some subjects, so students can learn both languages at the same time.

(3) Transitional mode. Students used all or part mother tongue at beginning of school, then gradually transformed into the use of foreign language.

At present, the languages for so-called bilingual in Mineral processing engineering are Chinese and English. The basic purpose of bilingual teaching is to guide students to broaden their academic horizons and improve the level of specialization and enhance their economic cooperation and competitiveness under the background of globalization. And to enable students to understand the latest development of this subject with English, so as to cultivate students' innovation consciousness and innovation ability [11].

Education is an indispensable part of human evolution, and every revolution of educational has an important impact on human development. Educational innovation refers to the implementation of new educational concepts and systems, to promote the progress of education, put forward the concepts of "quality education", "innovative education", "cultivate complex talents". It is a transformation of educational system and mechanism, to create a good environment for innovation education and quality education. Educational innovation is the driving force of national cultural transformation, and is the basis of national innovative spirit development [12].

Educational innovation is the need of the development of the times, is the only way to achieve the great rejuvenation of Chinese culture. From the view of education innovation, bilingual education is a category of educational innovation. By combination with professional reformation, bilingual teaching can be an important method to make a breakthrough in teaching theory in mineral processing engineering.

Therefore, from theory to practice, from the system to the method, from pre-school education to graduate education, from scale, quality to efficiency, all aspects of China's education are urgent to be innovated. And to strengthen innovation education, it is required to look at education itself and to reform the education itself.

3.5. Foundation for Cultivate Top - Notch Talent

In a certain sense, the number and quality of top-notch innovative talents will determine China's position in human history in the 21st century. However, China is now not only lack of top-notch innovative talents, but also lack of the structure of knowledge and ability, leading to the lack of masters in scientific areas such as Nobel Prize winners. We have not been able to create better conditions for the growth of top-notch innovative talent, and cannot provide an effective way of education and training. Although there are different types of talents, they have same characteristics as the strong desire and motivation for innovation, and the extraordinary creative talent. Top-notch innovative talents should be proficient in one or more scientific areas, and have ability far more than the average. They focus on the academic frontiers of a field and are keen in identifying and presenting key issues in academic development. They are imaginative, to have a strong ability to explore, and are good at discovering the laws of nature and social development. They are interested in a wide range, not only in the scientific areas, but also in the humanistic spirit and sensitivity to the characteristics of aesthetics. They are good at proposed valuable problem in cross-cutting areas.

Compare to talent, the more important for top-notch talent is the acquired education and training. Although individual innovation and creation will have his unique ways and means of thinking, there are many common laws for innovation and creation, which can also be trained through education and training. On the law of talent growth, twenty or thirty years old is the most creative age. There also has a process for growth of top-notch creative talent. At first, they need a master to bring them to the forefront of academic, which is required to use the individualized teaching. Secondly, the development of top-notch innovative talents also requires a platform for academic development from the community, such as to provide opportunities for further study, academic exchanges, and the necessary resources, funds and equipment. In a sense, top-notch innovative talent is a few outstanding talents who are beyond most people. Their growth often requires education in line with their characteristics. Bilingual education is such a method to cultivate top-notch innovative talents to meet needs of society, and strengthen their abilities.

3.6. Faculty Construction for Bilingual Teaching

High-quality bilingual teachers are the guarantee of successful bilingual teaching. However, it is difficult to adapt to the rapid development of bilingual teaching both in quantity and quality of our bilingual teachers, which has become a bottleneck restricting the development of bilingual teaching.

Based on this, the following suggestions are put forward to strengthen the construction of bilingual teachers:

(1) Qualified bilingual teachers must be compound talents both in professional and foreign language aspects

Language acquisition theory think that language is naturally acquired in a certain language environment. Therefore, it is vital importance for students to create a good environment for bilingual teaching. The basic principle of bilingual teaching is that the teachers should insist on using the target language (i.e. foreign language), whether they are teaching knowledge or answering questions. The teachers must use foreign language to create a good language acquisition environment for students. The students can have more opportunities to access the target language, so as to master the subtle language in the target language. This requires bilingual teachers must have a high level of foreign language and strong foreign language skills. However, this is no easy task and requires the leadership of our educational administration and teachers' schools to pay great importance to the development of a scientific teacher training program. For example, it is required to provide bilingual teaching for teachers on-the-job training or study abroad opportunities. Of course, bilingual teachers themselves should work hard. They should be clearly aware of bilingual teachers is not only a professional teacher, but also a language teacher. Qualified bilingual teachers should be a compound talent, not only to have a high level of English listening, speaking, reading and writing skills, but also have a solid foundation of basic knowledge and high teaching skills. They should have the ability of bilingual teaching integration, who can integrate language and subject teaching in one.

(2) Qualified bilingual teachers must respect and understand multiculturalism

Qualified bilingual teachers should first have a high level of two languages. The so-called high bilingual level refers to be able to listen, speak, read, write, and pronunciation standards in two languages with good fluency. However, I believe that even if the above-mentioned higher level is reached, it may not necessarily be a qualified bilingual teacher. To be a qualified bilingual teacher, it is required to respect for multicultural attitudes, familiarity with the cultural background of the two languages, understand the cultural differences between the two languages and respect the cultural traditions of both languages. In the context of economic globalization, cultural pluralism and internationalization of education, bilingual teachers not only have to master foreign languages, but also have to consider issues from the interests of all mankind and the global concept, understand the international community, care and tolerance for foreign culture, otherwise it is difficult to cultivate an "international quality" of innovative talents.

(3) Built strict assessment system and employment standards for bilingual teacher

The quality of bilingual teaching depends on the quality of bilingual teachers, so the education departments at all levels should formulate a scientific assessment system and strict employment standards. Bilingual teachers should normally be required to have a master's degree or higher. These teachers

should also re-enter the university for about one to two years of bilingual education, receive special bilingual teacher skills training, and then undergo rigorous tests such as English language proficiency tests, multicultural background tests, bilingual teaching ability and teaching strategy evaluation, teaching content integration and selection ability test. Qualified bilingual teachers can be obtained after the examination results. At the same time, it is need to use the auditor engaging mechanism of competition and surviving of the fittest to ensure the quality of bilingual teachers.

(4) Stabilize bilingual faculties by preferential policies

From the above prerequisite conditions for qualified bilingual teachers, it is can be found that it is more difficult to bilingual teaching than monolingual teaching. From the reality of our country, the good subject teachers do not necessarily own high level of English listening and speaking ability; while good English teachers cannot be capable of teaching specific subject. Therefore, good bilingual teachers, who are good at both professional subject and English, are rare. Based on this situation, it is recommended that education departments at all levels and universities need to formulate corresponding encouragement policies, such as give policy leaning in the title assessment, salaries, office conditions and study abroad. The stability of bilingual teachers is the key to improve the quality of bilingual teaching, and to cultivate international innovation talents.

4. Conclusion

This paper analyzes the present situation of bilingual teaching of mineral processing engineering in our college, and puts forward some corresponding measures according to the restriction factors of bilingual teaching. In the process of bilingual teaching in the professional course of mineral processing, it will appear more problems with the deepening of teaching. To solve these problems, we should continue to explore, summarize and improve, we need continuous efforts to explore teaching methods suitable for discipline development so as to greatly improve the teaching quality of the course of mineral processing, which is of great significance to cultivate energy oriented innovative talents. In addition, we need to learn the good teaching methods from the domestic and foreign in the process of the actual teaching. Then combine these teaching methods and apply flexibly so as to achieve the better teaching effect.

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