

Exploring the Chinese-English Bilingual Teaching Mode in an Applied University

—Taking Physical Chemistry Experiment Bilingual Course in Zaozhuang University as an Example

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Abstract—The primary responsibility of applied universities is to cultivate applied talents. Based on the application-oriented professional target, the bilingual course is established in a targeted manner, which makes the talents possess the ability of language and provides the possibility for the compound senior talents being delivered to the society. However, how can we effectively combine professional application with English to achieve twice the result with half the effort, which is a subject, needs continuous exploring for all the bilingual lectures. This paper takes the bilingual course of Physical Chemistry Experiment established by Zaozhuang University as an example; detailed analyses involve the motivation analysis, curriculum design, selection of teaching mode and assessment method. Some suggestions for teaching mode have been put forward combining with the professional characteristics of the College of Chemistry Chemical Engineering and Materials Science. These can provide reference for the construction of bilingual course in other applied universities.

Keywords—*bilingual teaching; Physical Chemistry Physical Chemistry Experiment; cultivation of compound talents; applied university; teaching mode*

I. INTRODUCTION

Since the Ministry of Education proposed that ‘the use of English and other foreign languages for teaching should be actively promoted in the university’ in 2001, bilingual teaching has become one of the important indicators for assessing the level of internationalization of a university. Bilingual teaching is a vital teaching practice for cultivating students with an international vision. It can cultivate students’ habits and abilities in reading English literature and material, as well as opening an international perspective [1-3].

To cultivate compound talents, the main support of English

teaching reform is the bilingual teaching, which not only enhances students’ foreign language at a basic level, but also enables students to possess further professional knowledge. When conducting crossing-border exchanges and cooperation, students can have prepared knowledge in this field. The preparation and understanding are conducive to the cultivation of compound talents in higher education institutions, so they are capable of conducting international exchanges and cooperation [4-5]. The development of college English teaching from the Basic English to professional English, and then to bilingual teaching, reflects the continuous improvement of the demand for talent cultivation in economic globalization and education internationalization [6-8].

With the evolution of time, the constant changes in the requirements of social economic and cultural construction, as well as the continuous promotion of the sustainable development of higher education, are both important basis for realizing the cultivation of specialized talents and strengthening of overall national strength in China [9]. At present, most colleges and universities have established bilingual course to different degrees according to their academic professional advantages and student acceptance, which cannot only effectively promote the internationalization of education, but also be a necessary stage in the development of global education [10].

II. INTRODUCTION TO COLLEGE OF CHEMISTRY CHEMICAL ENGINEERING AND MATERIALS SCIENCE IN ZAOZHUANG UNIVERSITY

Zaozhuang College is one of the applied universities in China. There are four undergraduate majors (*i.e.*, chemical, chemical engineering and process, applied chemistry and mineral processing engineering) and two special majors (*i.e.*,

Bilingual Course: Physical Chemistry Experiment (Zaozhuang University No. ysy15001).

applied chemical technology and chemical safety technology) in College of Chemistry Chemical Engineering and Materials Science. The major of chemical engineering and technology is honored as 'Shandong specialty major', 'Shandong Province Excellent Engineer Education and Training Program Pilot Program' and the first batch of 'Sino-US Double-Hundred Program Pilot Program'; the major of mineral processing engineering is honored as 'School-enterprise Joint Construction Major in Shandong Province'; the major of applied chemical technology is honored as 'Specialty Major in Shandong Province'. The professional advantages of these majors are quite obvious, and a large number of teachers with high academic qualifications are gathered here. The professional development of these majors is close to the academic frontier, and more and more cooperation with international exchange is joining in.

Undoubtedly, these professional advantages provide a fertile soil for the roots of bilingual teaching. Grasping the comparative advantages of these disciplines and actively carrying out bilingual curriculum education will be able to cultivate high-level applied talents.

III. CURRENT PRACTICE AND EXPERIENCE OF OFFERING BILINGUAL COURSE

'Physical Chemistry' is a rapidly developing discipline. New technologies, knowledge and opinions emerge continuously, also come with numerous new theories, vocabulary and technologies. These theories and technologies have penetrated into various related fields, such as chemistry, biology and so on. In 2016, we established a bilingual course in Physical Chemistry Experiment faced to undergraduate students in the sophomore. At this time, the students have experienced one and a half years of college English study, continuously; this bilingual education is just in sync with the remaining half of college English, building up a seamless integration of English ability in development training.

After three years of teaching practice research, it is found that students' learning goals can be mainly classified into 'integration tendency' and 'tool-type tendency'. The so-called 'integration tendency' refers to the interest of learners in forming a positive attitude towards the target language group to form contact with and exchange with the target language group. In terms of actual need, it is reflected in the motivation to study abroad, work in a foreign company, or engage in work related to foreign languages. The so-called 'tool-type tendency' refers to the learner's pure and natural interest in a language. They pursue the practicable value, superiority and sense of accomplishment, which is brought from the language, such as getting a good work, gaining a promotion, passing an exam, *etc.* Our targeted measures include: (1) For students with 'integration tendency' needs, the goal is to comprehensively training the listening, speaking, reading and writing skills of chemistry professional English, so their ability to deal with communicate professional problems in English thinking and language will be enhanced. (2) For students with 'tool-type tendency' need, the goal is to cultivate their independent ability in reading and understanding the original English books and access to English materials. Besides the explanation and case analysis in class, it is often necessary to supplement some

useful English references for understanding professional knowledge; therefore, the students can supplement and improve their ability after class.

In oral practice, students are encouraged to express their simple questions in English directly in class, and some mistakes in grammar or syntax should be tolerated. As long as they dare to speak out, they will be given appropriate compliment. In the process of teaching, different bilingual teaching modes are adopted according to the difficulty level of the course content and the relationship with the pre-requisite course. For the basic knowledge of the basic terminology and concepts needed for professional literature, a full-English teaching mode is adopted. For the content that students have already learned in other course, the full-English teaching mode is also adopted. For example, students have already studied the related content of "Inorganic Chemistry" in their freshman year, so the English thinking method is utilized to reproduce this part of the knowledge. When a completely new teaching content is taught, a hybrid teaching mode is better, follows an explanation in English firstly, and a further explanation in Chinese. This procedure helps students to feel the difference expression and thinking mode in two languages, and then further guide students to think over questions in English. Due to relatively familiar to some contents, the hybrid teaching mode is also adopted when dealing with simple introductions and material applications. Even a full-English teaching mode is executed; students still can roughly guess the meaning. Such hybrid teaching mode can deepen the students' impression, and also can promote students to learn how to express their thinking in English.

Except for an adequate preparation of lessons in teaching, more outstanding in-class design is required, combined with a variety of teaching methods. The first method is the powerful multimedia courseware. Multimedia is already the standard hardware in the college classrooms. The multimedia courseware with pictures and texts cannot only make the abstract principles, concepts and processes intuitive and vivid, but also help students to understand and master more easily, and also improve students' interest in learning. The second method is effective teacher-student interaction. Teacher-student interaction is a catalyst for improving the effectiveness of classroom teaching, especially for bilingual course. We must prevent the performance of the teacher from acting by themselves on the stage, even do not take the reflection of the students into account. For a successful class, students are not simply the viewers, but also should be engaged into this performance. Only follow this way, students will be more serious and proactive in keeping up with the rhythm of the teachers, and then improve their ability to listen and speaking in professional English. The third method is to make full use of the network communication platform. Establish online communication platforms, such as online course, course WeChat groups, and course QQ groups. This is an effective continuity and supplement of the classroom. When students encounter difficulties, they can discuss and communicate with teachers at any time. In turn, when teachers obtain some valuable learning materials, learning resources, or relevant frontier progress, they can deliver them to students at any time.

In the process of curriculum practice, we should not only focus on the dissemination of professional knowledge, but also pay attention to the cultivation of students' abilities and quality. More engagement of students' interaction should be arranged, also some questions for students to answer should be designed, which can motivate their enthusiasm in learning and develop their English thinking skills. In addition, a simulating international conference stimulates students to consult relevant materials, then they come to the stage to explain the topic in English via PPT, the audiences can ask questions about the content. The ability to communicate develops students' understanding, mastery and analytical skills in basic knowledge, cultivate their initial ability to communicate in a cross-cultural context. In the process of teaching, efforts are made to improve students' cognitive ability, to serve the society, to build a sound material science and engineering knowledge structure, and to have the basic quality of materials science and engineering. Eventually, it is necessary to improve the students' international vision and cultivate their ability to communicate across cultures.

The assessment is not simply to test students' mastery of the course, to help teachers continuously summarize teaching experience, to improve teaching methods and techniques, but also to make objective and scientific evaluations of students' learning results. The characteristics of the subject curriculum ultimately play a role in consolidating the foundation and strengthening the ability. The content of the assessment should be balanced between knowledge and ability. Thus, a decentralized assessment method is set up considering multiple assessment points, aiming to pay attention to each small progress of students and guiding students to love bilingual course, as well as exploring a way to motivate students and can fully reflect their learning abilities. According to the content and characteristics of the bilingual course, a combination of the process assessment and the quality of the experimental report is used to give a relatively objective judgment on the learning effect of the students. The scores of process assessment include attendance, pre-class/in-class/after-class answering questions, and the quality of the course presentation. The experimental report requires to be written in English with at least 80%, and persuades the students to give an error analysis with an English expression. Here, the mastery of professional knowledge is concerned, but the grammar and spelling mistakes are not to be overemphasized.

IV. INNOVATIVE MEASURES

Except for the regular measures mentioned above, based on our own characteristics and researching experiences, extra two innovative approaches are listed as follows:

(1) *Integrate personal research work, scientific achievements and preface technology into bilingual teaching.* Teaching and research complement each other. Teachers can obtain the latest and most relevant scientific and technological achievements in a timely manner. Combining their own scientific research experience and personal scientific understanding, such post-processing professional knowledge can be accepted by students easily, which is a great help to students in integrating of the basic knowledge and practicable applications.

(2) *Integrate innovation and entrepreneurship education into bilingual teaching.* This approach not only conforms to the state's planning for the development of education, but also meets the requirements of the current 'production, study and research' collaborative innovation on the cultivation of talents in universities, and also improves the efficiency and effectiveness of the application. This method builds up a solid foundation in exploring a training curriculum system for new talent training facing the major need of the country and an international horizon.

V. CHALLENGES AND REQUIREMENTS FOR BILINGUAL TEACHING TEACHERS

First, teachers who undertake bilingual course should have a solid background in professional knowledge and deep-thought understanding of the latest academic frontiers. The purpose of bilingual teaching is to cultivate bilingual talents, so teachers must have the ability to constantly engage in new knowledge and try to introduce new methods into a class. Secondly, teachers must have a high level of English language and make a Standard English pronunciation. In order to cultivate students possessing 'bilingual thinking mode', the teachers themselves should cultivate their own English thinking mode via various channels, such as attend bilingual teaching training, read and learn the full-English course from foreign universities, engage in a promoting school, etc., all of these can significantly improve the overall quality of teachers themselves. In addition, innovation of the innovative teaching modes should be concluded when it appears in colleagues' bilingual class. On the basis of bilingualism, teachers can further explore their own teaching charm, make vivid explanations in the topics, activate studying atmosphere via proposing some interesting questions, etc. The effort from teachers is to expand students' horizons, stimulate students' enthusiasm; accordingly, beneficial results are believed to emerge during curriculum teaching.

VI. SUMMARY

To extend the students' language skill in the applied universities, the bilingual class is essential. The teaching effect not only depends on the design of teaching threads in class, but also a compact interaction from both teacher and students. An enhancement of teachers' international view is also needed urgently, which can acquire from the visiting foreign universities or from the training. However, the most important characteristic for the bilingual teacher is he or she must love this teaching mode, and is willing to devote time on this enterprise. Then, a stream of good ideas for the application of pre-class, in-class, post-class and thinking will arise to refine our bilingual course. A potential improvement from students' progress will reward what your efforts. Students who experience such bilingual training in professional course will find a better job, or a higher position or promising job they can challenge not only based on their applied major, even possess a higher successful possibility in hunting a foreign-owned enterprise to realize their first step of international working experience.

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