

Research and Practice on Bilingual Teaching in Local Colleges

—A Case Study of the Course of Introduction to Computer Science

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Abstract—Bilingual teaching has achieved good results in many key universities in China, but in local colleges and universities it faces great challenges for various reasons. In order to give full play to the role of bilingual teaching, after analyzing the current situation and conditions of bilingual teaching in local colleges and universities, several suggestions on clarifying the teaching goals of the courses, the selecting and training of teachers, the selection and preparation of teaching materials, the examination and evaluation of the courses are put forward in this paper respectively. The results of the relevant bilingual teaching reform project of the course of Introduction to Computer Science carried out in Jingchu University of Technology show that the proposed methods and measures are effective and practical.

Keywords—*bilingual teaching; teaching reform; local college; introduction to computer science*

I. INTRODUCTION

As early as 2007, the Ministry of Education promulgated the "opinions on the implementation of undergraduate teaching quality and teaching reform project" [1]. It is required to promote bilingual teaching in colleges and universities, to improve the use of bilingual teaching in general and major courses in colleges and universities, which can make higher education in China more international and cultivate compound talents with international vision, international competitiveness and international cooperation.

At present, most of the key universities in China have carried out bilingual teaching. These schools have made many achievements in the selection and training of bilingual teaching staff, preparation of bilingual teaching materials, bilingual teaching content and reform of teaching methods [2].

However, the progress of bilingual teaching in local universities is slow due to various reasons: poor students' English foundation, weak self-study ability, and relatively lack of bilingual teaching teachers [3]. The above differences determine that it is difficult for local universities to copy the bilingual teaching model of key universities. Therefore, it is very important to explore a bilingual teaching model suitable for local universities itself.

The theory and technology of computer related majors

mainly come from English speaking countries, and the most widely used programming languages and technical materials about computing are also mainly in English. As a language of computer and Internet industry, English has the irreplaceable role of other languages [4]. Therefore, bilingual teaching in Chinese and English for students majoring in computing is a natural course for computer majors.

Since 2016, the Computer Engineering College of Jingchu University of technology began to carry out the practice and reform of bilingual teaching in majors such as computer science and technology as well as information management and information system, and has made certain achievements. The achievements include methods and measures about how to clarify the teaching objectives, how to select and train teachers, how to select and prepare the teaching materials, and bilingual teaching, and how to evaluate the effectiveness of bilingual teaching.

II. CLARIFYING THE PRIMARY TEACHING GOAL

Introduction to Computer Science is the first major basic course for students in computer-related majors to study. It gives a summary of the sub disciplines of computer science and technology, including the basic principle of computer, data and coding, operating system, database system, computer network, computer security and so on [5]. The basic knowledge is to broaden students' horizons, cultivate students' interest in computing, and master the basic skills of computers.

Bilingual teaching of the course of Introduction to Computer Science is to make students have an environment of learning and thinking in English when learning the basic knowledge and skills of computing, so as to improve the students' ability to use English to acquire and communicate the knowledge of computing [6]. Bilingual teaching in Introduction to Computer Science enables students to stand higher and see farther at the beginning of college.

Jingchu University of technology is a local undergraduate college, and the computer basic knowledge and skill level of students majoring in computing are relatively low, which objectively determines that the primary teaching goal of the course of Introduction to Computer Science is to master the basic knowledge and skills of the computer [7]. Bilingual

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teaching is only a means. We must not put the cart before the horse. We must not overemphasize the cultivation of English applying ability and deviate from the basic teaching goals of this course. On the other hand, we should give full play to the role of Chinese-English bilingual teaching to improve the students' applying ability of English.

III. SELECTING AND TRAINING OF TEACHERS

Bilingual teaching requires teachers not only to have professional knowledge, but also to have high level of listening, speaking, reading and writing in academic English. For local undergraduate colleges, such teachers are few. Computer professional teachers, who know the professional knowledge of computer, and have rather higher English reading ability. However, their English listening and speaking ability is relatively weak, which fails to achieve the real purpose of bilingual teaching. Teachers of English major have higher English listening and speaking abilities, but they are not competent enough to understand computer expertise.

In order to obtain competent teacher of bilingual teaching, we firstly need to select a computer professional teacher who has good English foundation. The basic condition is that they must have level CET-6 (College English Test-Band Six) or above. The next step is to train these teachers in English application ability. Considering all kinds of English training program, we choose IELTS Academic English training. The first reason is that IELTS is widely recognized as a reliable means of assessing the language ability of candidates who need to study or work where English is the language of communication. The second reason is that it emphasizes the practical application of English and involves all the four aspects of English (listening, speaking, reading and writing). The academic module of IELTS is for candidates wishing to study at undergraduate or postgraduate levels, and for those seeking professional registration, which is very suitable for teaching and communicating of professional courses in the college class. As the chief lecturer of this course, after one year's preparation, I achieved a score of 6.0 of academic IELTS, which lays a good foundation for the bilingual teaching of the course.

Fig.1 represents the steps and standards to select the qualified bilingual teaching teacher. It should be noted that in the first step we should choose teachers who meet the two standards: hold the master degree of computer science and passed the CET-6.

IV. ACTIVE BILINGUAL TEACHING PROCESS

In the practice of teaching reform, five aspects of bilingual teaching of the course have been actively explored, which are preparing the bilingual material, balancing the use of Chinese and English, exercising, restricting the number of students in a class, and evaluating the effectiveness of the bilingual teaching.

A. Preparing the Bilingual Material

We should choose the original textbook which is widely used by foreign universities, and try to make the students come into contact with the original English instead of

"Chinese" English written by the domestic teachers. This course is bilingual teaching in Chinese and English. The teaching textbook is *Computer Science An Overview:11th Edition*. This textbook has been well accepted by teachers and students from various countries in the world for many years. It is the first choice for many famous universities, such as Harvard University, Massachusetts Institute of Technology, Princeton University, University of California at Berkeley and so on. It also has a wide influence on the teaching of colleges and universities in China.

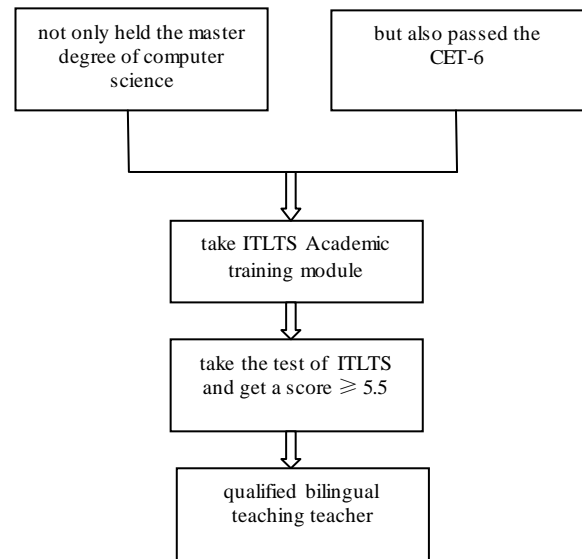


Fig. 1. Steps and standards to select the qualified bilingual teaching teacher

Another reason for the selection of the textbook is that it is good at making complicated subjects understandable, full of illustrations, and the content is fascinating. It is very easy to arouse the interest of the readers.

As mentioned before, Jingchu University of Technology is a local university, and in general our students do not have a good foundation of English. At the beginning, they are not very confident about bilingual teaching and the original foreign textbook. But gradually, with the help and guiding of the teacher, many students are attracted by the lively foreign textbook. More importantly, when students realize that they are using the textbook which are also used in MIT or Princeton, and the course content is basically within their understanding, their self-confidence is greatly enhanced. Here we should remember that Interest is the best teacher and is the premise of active learning.

In addition to the original textbook, we also select a widely used Chinese textbook as supporting. In the lecture notes, the original textbook is annotated and complemented to not only maintain the original taste of English, but also the advantages of Chinese supporting textbooks. At the end of each chapter, Chinese and English vocabulary, and the Chinese and English summary are added, which is beneficial to the students' understanding and mastery of the main points of the teaching. At the same time, these lecture notes are put on the network teaching platform, which is conducive to students' self-learning.

B. Balancing the Use of English and Chinese

The use of English, including the language of teachers and students in class, the use of English in the blackboard and PPT, and the use of English after class, should be balanced. On the one hand, bilingual teaching should not just scratch the surface and be formalistic. On the other hand, it should not beyond the students' ability to bear [8]. Table 1 shows that when Chinese and/or English are used in different teaching materials and circumstances.

TABLE I. USING CHINESE AND ENGLISH IN DIFFERENT CIRCUMSTANCES

Teaching Materials and Circumstances	The language Used (Chinese/English)
Primary textbook	(written) in English
Supporting textbook	(written) in Chinese
Teaching plan	(written) in English
PPT(electronic courseware) when teaching in class	(written) in English
Explanation of simple questions when teaching in class	(spoken) in English
Explanation of complex questions when teaching in class	(spoken) in Chinese

C. Restricting the Number of Students in a Class

For most students in a local college like our Jingchu University of Technology, speaking and listening of English is weaker than reading English. Apart from the primary goal mentioned in section II, another important goal of bilingual teaching is to give students more opportunities to practice English. If a class has too many students, for every students the average time to practice English (such as making a representation in English or interacting with the teacher in English) will be less in the time of a class. It is a common practice that bilingual teaching class always have a restriction of students number of about 30 to 40 in a class, otherwise the effect of applying and practicing English cannot be realized.

D. Exercises after Class

For bilingual teaching, we divide exercises into three different levels in terms of their difficulty.

The first level: is the easiest level, which is to master of the core English words involved in each unit of the courses. In order to make students learn from the scattered time, we developed the online testing system of the bilingual basic knowledge on the website. The system supports the access of the mobile phone. It is convenient for the students' self-review and self-test.

The second level: is teachers' offline homework and online homework, both in Chinese and in English. The goal of this kind of exercise is to mater the basic theories and principles of the course of Introduction to Computer Science.

The third level: is comprehensive exercises and is the most difficult level because this kind of exercises is in English completely. This kind of exercises is mainly for some

excellent students to improve themselves and not required for every students.

E. Evaluation of Bilingual Teaching

The evaluation of bilingual teaching is a critical step to reflect whether the desired objectives of bilingual teaching has been fulfilled. Bilingual teaching has two objectives: the first one is to help students master basic professional knowledge and skills; the second is to enhance students' ability of applying English. In order to evaluate the effectiveness of bilingual teaching, it is not only the expertise of the relevant subject should be evaluated, but also the English level should be assessed.

The final test is the most important form to assess the effectiveness of the course. The total score of the test paper is 100 points, consisting of 50 points of English questions (objective questions) and 50 points of Chinese question (both objective questions and subjective questions).

Another important form of assessment is the usual performance in class and assignments after class. It is time-consuming to carry out the examination of basic application of listening and speaking in English. Our preliminary idea is that every three weeks there will be an English oral presentation, and the results account for 50% of the midterm grade. The purpose is to make the students apply English more frequently and cultivate the interest and basic ability of academic communication in English. The other 50% of midterm grade comes from the quality of the students' assignments.

Fig.2 illustrates how to evaluate the performance of bilingual teaching.

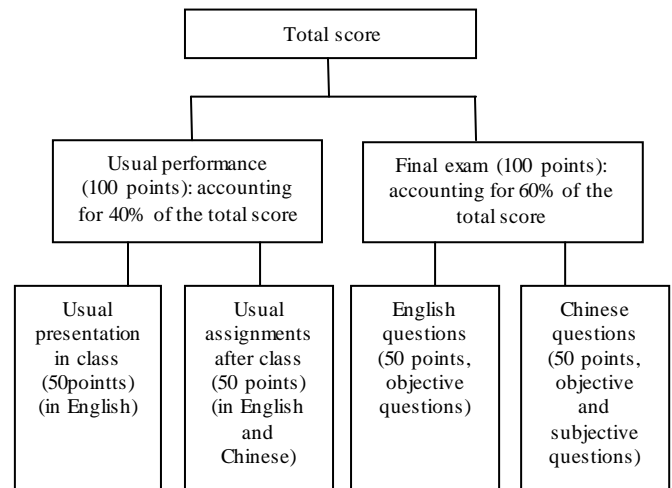


Fig. 2. Evaluation model of bilingual teaching

V. CONCLUSION

There are a few challenges when carrying out bilingual teaching in local universities in China. In this paper, based on a project of bilingual teaching reform implemented in a local university, we propose a few measures and methods to improve the quality of bilingual teaching. Firstly the primary

goal of bilingual teaching should be determined and the standards of the qualified teachers be set. At the same time we should also pay attention to how to prepare the bilingual materials, how to balance the use of Chinese and English, the restriction of the number of students in a class, the exercises after class, the assessment of the performance of bilingual teaching.

REFERENCES

- [1] Z. W. He. *Exploration and Practice of Bilingual Teaching Reform in Chinese Universities*, Beijing: Higher Education Press, 2010. In Chinese.
- [2] H. N. Wu, X. H. Chen, L. Zhang. "On the feasibility of bilingual teaching of thermodynamics in undergraduate physics major," in *University education*, 2015 (1): 166 - 167. In Chinese.
- [3] Y. Liu, Z. F. Tan, G. P. Lei. "Attempt and Reflection on Bilingual Teaching Reform in Colleges and universities," in *Popular Science and Technology*, 2011 (11): 180 - 181. In Chinese.
- [4] X. J. Gao. "Bilingual teaching reform of computer basis," *Journal of Inner Mongolia Agricultural University (Social Science Edition)*, 2011, 13 (6): 122-123127. In Chinese.
- [5] X. B. Li. "Practice and discussion of bilingual teaching in computer introduction course," in *Computer Knowledge and Technology*, 2014, 10 (16): 3843-3845. In Chinese.
- [6] R. J. Huang, Z. Wang, Q. Chen, D. B. Pan. "Exploration and Practice of bilingual teaching reform in context of Sino-foreign cooperation in running schools," in *Journal of Southwest Normal University (Natural Science Edition)*, 2018 (1), Vol.43, No.1. In Chinese.
- [7] Y. Qu, Zh. B. Wang, J. J. Wang. "The current situation of bilingual teaching in Chinese colleges and universities," in *Higher science education*, 2014 (2): 104 - 108. In Chinese.
- [8] D. P. AUSUBEL. *The Acquisition and Retention of Knowledge: a Cognitive View*, Dordrecht: Springer Science & Business Media, 2000: 67-72.