LANGUAGE ORIENTED APPROACH OF TEACHING PROGRAMMING SKILLS

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ABSTRACT

Owing to the lost of real meaning after translated English textbook into Chinese, the author carries on using English textbook for the software programming teaching. This paper introduce the author's practice focus on the native language of technology inventor.The teaching reform detail include selecting textbook from all language version, giving lessons in inventor's native language, concentrating the content based on the predecessor courses, demonstrating occupational operating environment in experimental scenes, and so on. After four years practices, the renovation have achieved good effective and efficiency. With causality analysis and induction method the author proposed a new issue of Language Oriented Approach of Teaching.

KEYWORDS

Language Oriented Approach of Teaching, Inventor's Native Language, Programming Professional Training

1. INTRODUCTION

In Chinese education, the use of original English teaching materials can be traced back to the founding of new schools in the late Qing Dynasty. It has evolved with timeline for 160 years, and until now, top universities in China have continued to use the convention. But for ordinary colleges and universities, the use of original English textbooks for teaching is not popular. Is it necessary to use original English textbooks for teaching reform? Is there curriculum adaptability in the implementation of employing original English teaching materials? executive teachers are more busy in teaching, and leaving the questions to education experts to think about. But in instructing practice for Computer Science and Technology majors and the relative majors, There is a great need for native English teaching,materials and textbooks.

In the fall semester of 2018, the author directly used English textbooks and carried out teaching reform. having researched and analyzed on the reasons for graduated students to curl up home with golden diploma but not to work, though in hot need majors, the author realized that the teaching reform focus on textbook language selection is needed for computer related majors. The computer related majors mentioned in this paper refer to the majors whose code's first four digits are 0812 in the Catalogue of Undergraduate Majors of General Institutions of Higher Learning independently applied by various colleges and universities,which is according to the catalogue of professional degrees granting and talent training issued by the Academic Degrees Committee of China. The following are the author's practice introductions and experience demonstration of using the original English textbook in the course "*Software Testing Foundation*".

2. BACKGROUND AND SIGNIFICANCE OF CURRICULUM REFORM

Under the new situation of the education reform of improving the quality of undergraduate education in contemporary China, the former minister of education advocated the return to undergraduate education and the development of golden courses; The current Minister of Education, Jinpeng Huai, advocated the comprehensive implementation of the new development concept, to promote all levels of education put on the road of high-quality development, college teachers should innovate talent training mode, set off a classroom revolution. The author gave Software Testing lesson so that he carried out teaching reform on language choice in response to the requirements for the education quality lift.

2.1. Course Introduction

The object of teaching reform is software testing course of software engineering specialty. Firstly, the course of "software testing" was divided into two courses: "*Software Testing Foundation*" and "*Software Testing Technology and Practice*". *Software Testing Foundation* is the core course of Software Engineering (testing) major,and it is also a compulsory course for Software Engineering majors. Through the study of this course, students can systematically learn and master the basic principles, methods and standards of software testing on the basis of the acquired knowledge of program design and data structure in previous term. In order to let students understand the principles and methods of software testing, this course also combines theory and practice, arranges computer experiments, and makes students master the skills of using software testing tools such as using automated testing Junit software for testing practice. It lays a good foundation for students to acquire software testing ability and software development ability systematically, and also trains students' ability to design test plans by applying coverage criteria. "*Software Testing Technology and Practice*" is a course of skill nature, this paper only introduces the teaching reform of "*Software Testing Foundation*".

2.2. Background of Teaching Reform

In computer related majors, skill courses require the cultivation of hands-on programming ability. Programming course is of great significance to students' employment, postgraduate entrance examination and career innovation practice. In the process of programming skills teaching, the development platform used, whether it is Studio, Eclipse or IntelliJ IDEA, almost all the software development environment is English interface, human-computer interaction language is English, and almost all the help documents of software development tools are made in English. In the process of testing and debugging software, software engineers mainly obtain software error information through English prompts. In this way, English proficiency is very important for students' study, and thus for their future employment.

2.3. Significance of Curriculum Reform

In current software development,professional training to promote the employment of students is oriented to testing so that software developing can get aid. Software Testing plays an important role in the series of training of software programming. The author positioned the course "*Software Testing Foundation*" in a key field to promote skill training reform and quality improvement of undergraduate students. The implementation of the teaching enhancement and reform in this course can also provide assistance for postgraduate students entrance and lay a good foundation for entrepreneurial students to learn from foreign technologies.

Software Engineering major is currently the highest salary for graduates, but high salary requires strong vocational skills to support, so Software Testing job is a high skill needed occupation. *Software Testing Foundation* is the core course to train and improve the technology and skills of software engineering. By using the English textbook and material in the teaching of this course, students can consolidate their English foundation, improve their software testing skills, and improve their human-computer interaction skills in the process of programming and debugging.

3. CURRICULUM REFORM TEACHING DESIGN AND REFORM MEASURES

As a course teaching reform, the teaching reform of *Software Testing Foundation* updated the teaching method of the lesson giving, and guided the students' learning preference for various contents, changed the direction toward more conducive cultivation of professional ability, promoted and motivated the formation of excellent learning methods and habits. Moreover, the reform of this course was of great significance to the teaching reform of information technology courses, which could further promote the reform of teaching mode and teaching method of Engineering courses.

3.1. Reform in Instruction Design

The idea of the author's teaching design was based on the need of job requirements, and the teaching agenda of "*Software Testing Foundation*" was sliced into aspects: Began with the requirements of the software engineering major training program; executed with the characteristics of the curriculum dependency of Software Engineering; aimed at the the students' employment and professional skills upgrading needs. The author optimized the teaching design of the course of "*software testing foundation*". Specifically, it includes the following contents:

3.1.1. Teaching Material Selection Reform

In line with the idea of respecting the original, loyal to the original, teaching reform chose the classic teaching materials, and used original English teaching materials, which is the basis of teaching reform. Moreover, the author emphasized the selection of textbooks that have been recently published and used. The edition published after 2017 was in the range of target edition for selection. For this purpose, "*Introduction to Software Testing*" co-authored by Paul Ammann and Jeff Offutt from George Mason University was chose. Besides meeting the above requirements, The selected examples tor this textbook are all materials from *Data Structure*, which makes the *Software Testing Foundation* become the consolidation and expansion of the *Data Structure* course in the professional cultivation. The author kept line with the Teaching and Research Office policy on instructions,which attaches great importance to the construction of the course *Data Structure* and takes the course *Data Structure* as the center of the whole curriculum system. The Teaching and Research Office has applied for the university-level course construction project and has been approved get mark. The author chose textbooks in this way so that curriculum construction can mutually promoting other courses in whole speciality construction, rather than a decentralized and independent teaching reform.

3.1.2. Reform of Students' Practice Work

For that teachers assign questions in Chinese to students' homework, which is not in line with students' situational environment in professional business and programming practice. Students encounter English interface in the process of programming and testing, and rarely Chinese interface. The use of Chinese questions can not meet the requirements of situational training, and there will be a certain gap between the actual acquired skills and the objectives of the course

teaching design, which will affect students' employment ability after graduation. To this end, the author wrote the Chinese exercises into English exercises, so that students can have the effects of working situational impression and on-site experience when doing exercises.

3.1.3. Reform of Educational Documents

Record and examination of the teaching process needs to keep file, the teaching reform strictly implement the regulations on educational administration teaching management system. The author made newly the teaching outline, teaching lesson plans, and those document in reform of language such as PPT, etc, rewrote the English syllabus, English teaching schedules, English teaching lesson plans, renewed English and Chinese bilingual teaching PPT.

3.1.4. Reform of Lecture Style

The innovation project intends to change the trinity of teacher explanation, blackboard writing and questions in traditional teaching method, and adopt a new bilingual teaching method, with more than 60% of teacher explanation in English and 40% of blackboard writing in English. Demonstrate and explain important concepts, principles and keywords in English. In class, students are encouraged to ask questions in English and teachers give answers in English.

3.2. Reform in Teaching Organization

The author don't think the teaching reform of "*Software Testing Foundation*" is independent. In fact, it is closely connected with other courses of Software Engineering major, and it is an element of the whole Software Engineering curriculum system. The use of original English textbooks is not only beneficial for this course, but also shows quality advantages for many courses. However, the use of English teaching materials needs to solve the problem of teaching methods, only a good teaching method can make the original English teaching materials play its advantages in ability training, so it is necessary to promote the teaching reform to the level of organization and management innovation. The author's suggestions are as follows:

3.2.1. The Establishment of Teaching Station Using the Original English Teaching Materials

In view of the importance of the reform, this course and successor courses need to be systematic management and implementation in the organization and management. It requires the support of a work place and a agent of formal work organization. Independent office space is needed for teachers and students to study the original English textbooks. Teaching team is needed to be established, members include the backbone of the original English teaching materials suing teachers, absorbing those who actively engaged in bilingual teaching and those who was trained ready go abroad. In the station the author promoted English teaching procession, exchanged experience on bilingual teaching internally. These works had a demonstration effect on the whole school.

3.2.2. Recruitment of Teaching Assistants

Since English teaching requires the efforts and time more than three times of ordinary, teaching assistants are very needed. In view of the actual situation of our school, the author suggests recruiting students to be teaching assistants, to assist the lecturers with making teaching documents and correcting homework guided by the teaching administration. It also trains excellent students to participate in English using scene at an early age and provides them with excellent internship opportunities in graduation.

3.3. Reform in Teaching Practice

Using the original English materials to practise teaching can improve students' program code writing ability, so as to improve students' vocational skills. After the implementation of the curriculum reform, It encourages students to study hard and promote their studies, excellent students can be sent to cooperative enterprises for internship during the winter vacation. At the same time, teaching team can obtain test task templates or use cases from the projects, even products of cooperative enterprises, and over, returns them to promotion station for study on teaching methods, which will be used as experimental materials for future software testing courses, thus enriches the teaching resources of "*Software Testing Foundation*" and other software courses.

4. TARGET OUTCOMES OF CURRICULUM REFORM AND BENEFICIARIES

Using the original English teaching materials in instruction practice and teaching reform, can be benefit for several aspects, such as the students, the teachers and the employer enterprises. More significantly ,as a teaching reform, the teaching effects of instruction as a whole has a leap progress, it is greatly improve the quality of teaching practice unit for professional course.

4.1. Beneficiaries of Educational Reform have Radiation Effect

The most beneficial subject of the teaching reform of the using original English textbooks is the students in school who was receiving education, and their professional ability have improved rapidly. The teaching experience of the using original English teaching materials has extended to the whole specialty, the whole department, and the whole school , through the teaching promotion station, so that every teacher who is willing to adopt the original English teaching materials and bilingual teaching methods are all the beneficiaries.

At present, the global talent market have a great transformation in talent structure and knowledge structure. With the rapid development of digital technology and software industry, software technology and software design talents have become the urgent resources of the society. In recent years, software engineering education has developed rapidly in colleges and universities. The educational administration of colleges and universities is now generally a auto optimization system. The teaching reform of using English original textbooks have brought good teaching effects to colleges and universities. At the same time, it has brought good opportunities to software training institutions. The teaching reform of using original English textbooks has radiated from universities to training institutions, and promoted the further improvement of software personnel training efficiency.

4.2. Teaching Reform Results in Teaching Resources and have an Accumulation Effect

The teaching reform of using original English textbooks has formed some teaching resources, which can be used repeatedly in future teaching rounds. The continuous accumulation of teaching resources will greatly promote the improvement of the teaching quality of professional courses, and also optimize the strategic planning of the school's professional construction. The teaching resources of "*Software Testing Foundation*" are as follows: A set of English teaching syllabus, including theoretical courses and experimental courses; An English teaching plan for teachers to use in teaching; An English teaching PPT for teaching use; The textbooks used in the translation version of Chinese for students' reference. Additionally a new compiled word list for each chapter and paraphrase for students to use when reading English textbooks,and a written English

exercise sets, including judgment, single choice, multiple choice, filling in the blank, etc. for students to exercise after class or review at the end of the semester.

In the process of writing teaching documents, the author not only met the requirements for students' use, but also obeyed the requirements of school educational administration. The latter requirement is often the focus of the work. The work of teachers must up to the level of educational administration requirements. It is the responsibility of every teacher to comply with the standards and norms formulated by the educational administration department, but this often brings about double workload for teachers. However, once the accumulation of teaching resources reaches a certain scale, it will get twice the result with half the effort.

5. EDUCATION ACHIEVEMENTS OF CURRICULUM REFORM

After four years of teaching reform, the first classes of undergraduates who use English textbooks graduated, and students who got jobs in big companies and big cities had doubled. Employment situation of the Software Engineer students had improved dramatically, with substantial increase in salary. The number of admitted to graduate school had increased, and the enrollment rate had increased from 3 percent to 15 percent. Of course, these progress and improvement were formed by many factors, but the teaching reform of using original English textbooks was the most important one.

Software Engineering is a major integrating software engineering technology, software development technology and software testing technology. Compared with other computer majors, the teaching content and curriculum of Software Engineering major are much the same as others, and can be basically interchangeable. The teaching reform experience represented by Software Engineering instruction can be extended to other computer related majors,and more,other technology majors.It is beneficial for the quality of the whole engineering education.

6. CONCLUSION

Twenty years ago, some college students majoring in computer science or software in China could not get on trace, and had difficulty in learning. Some teachers, including the author, said that they lacked computer thinking. In 2006, Jeannette M.Wing, Dean, Department of Computer Science, Carnegie Mellon University, published an article and gave the academic concept of "computational thinking"**Error! Reference source not found.**, which is now given as a basic course for students majoring in computer science in many China's university. It became a significant measure to promote the learning effect of students in computer science and related majors.

After re-thinking, the author has devoted himself to the study of the teaching effect of language factor for 10 years, tried to keep practicing, strive forward another way. that is what was described in above sections. The author uses technology inventor's language to teach programming which employs that technology, it can also greatly improve students' learning efficiency.

The principle of this approach can be expressed in brief, "this method is recommended if the following three conditions are met: 1.The language used is not the language reside in language-teaching. It is engineer teaching, not language teaching. 2.The language of the technology inventor is quite different from the native language of the students. 3 The language is required in the course of employing the technology." the author conclude above.

In fact, the author explores a new approach for technology teaching to improve learning efficiency.If this approach is spreading, more students will easily acquire the skills needed in employment. And on the other hand, this efforts will promote intellectual property protection and respect for originality. This is the real meaning of our teaching reform. However, limited by time and energy, the theoretical system on the Language Oriented Approach of Teaching issue, has not been developed. Leave it to interested colleagues. It must promise.

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