Discussion and Innovation of Full English Teaching Methods for Graduate Students Majoring in Mechanical Engineering

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Keywords: Graduate teaching, Full English teaching, Method improvement, Teaching idea.

Abstract. Full English teaching is an important way to promote the internationalization of education in colleges and universities. Based on the problems probably existed in the process of full English teaching for graduate students majoring in mechanical engineering, in this paper the relevant situations taken in the process of full English teaching in Europe and American universities are introduced, and the methods and innovative ideas adopted in the process of full English teaching for graduate students majoring in mechanical engineering are discussed. Furthermore, some advanced teaching concepts or approaches such as the modern teaching based on information, the diversification and interaction teaching, the genuine knowledge coming from practice, the research projects promoting teaching and the introduction of frontier knowledge and technologies, etc., are investigated, which are in coincidence with the strategic objectives of cultivating compound talents formulated by Ministry of Education.

Introduction

At present, the internationalization of education has become the trend of educational reform and development in China [1, 2]. As some key departments which can provide teaching and research conditions and empower a degree, colleges and universities must constantly renew the ideas of education, deepen the reform of curriculum, adjust the teaching organization and management, explore and innovate the methods of teaching, in order to meet the needs of internationalization education. Based on that, with the increasing of opportunities of cooperation and exchange in international teaching and scientific research, the importance and urgency of developing and promoting English teaching are becoming increasingly prominent [3,4].

In order to improve the quality and the level of internationalization of graduate students, a series of full English teaching curriculums has been built and carried out in many universities so as to encourage teachers to learn the international advanced teaching concepts and methods, to train the students to be familiar with the criterion of international academic exchanges, to strengthen the professional foundation, to have a good professional English level, to have the ability in using English to do scientific research, and finally to enable them to become internationally competitive high level professional and technical talents.

Take “Mechanical Engineering” as an example, teachers are used to construct the curriculum based on the international general “Mechanical Engineering” specialty in many colleges and universities, and consider the respective characteristics of professions and research directions. Generally, starting from the research of course system, they can lay down the full English teaching outline and training scheme for mechanical engineering graduate which conform to the respective characteristics. Usually the whole formulated English courses will cover mechanical manufacturing and automation, mechanical design and theory, machinery and electronics engineering, vehicle engineering, power machinery and engineering, traffic engineering and other disciplines and directions.

In this paper, aiming at the problems possibly existing in the process of current mechanical engineering specialty in colleges, we analyze the reason, and put forward the suitable full English teaching methods and innovative ideas used in mechanical engineering specialty on the basis of
teaching concepts of graduates majoring in mechanical engineering in European and American universities. It is a useful exploration for training of high level research talents with international vision in mechanical engineering, and for enhancing the international communication and participating in international competition [5].

Problems Existing in Current Full English Teaching

Firstly, there is the challenge of language. In the process of professional full English teaching, the lectures are usually Chinese teachers. Since English rather than their mother tongue is used in teaching, their language expression and thinking way have a obvious difference with foreign teachers, there will be the phenomenon of "Chinglish" more or less. In addition, the students' English level are distinct, their comprehension abilities are different with each other inevitably. This is also the biggest challenge of implementing full English teaching.

Secondly, the deficiency of specialized glossary is apparent. For many courses in mechanical engineering, there is certain to be lots of specialized words and terms. These words can be spoken, explained and understood in Chinese, but how to express properly, speak clearly and understand it completely in English, which is a problem for both teachers and students.

Thirdly, the lack of auxiliary teaching methods is obvious. Especially for engineering majors such as mechanical engineering, professional theoretical knowledge must be closely related to actual research and engineering applications. In other words, theory must be connected to reality. In the process of teaching, how to use the auxiliary teaching tool, to combine with the practical engineering application, and then to teach the professional courses well, also needs to carry on multi-level attempt.

Fourthly, the appropriateness between the arrangement of courses and the teaching objects is hard to master. Because the subjects are graduate students facing the pressure of graduate, especially doctoral students. Some postgraduates' research topics may not be closely related to some courses. It deserves the deep discussion that how to establish the relevance of the course and their research directions and to arouse the interest of students.

Teaching Enlightenment of European and American Universities

At present, the teaching of European and American universities is often embodied in small and live, diverse and students-centered classroom teaching. The teaching methods are different from teachers' teaching, the communication between teachers and students, students' group discussion. Even in the process of teacher-centered teaching, teachers will irregularly use different teaching methods and means, such as asking questions, answering questions, investigating and practicing, performing experiments, etc. and advocate group activity type teaching method. Emphasize the "students-centered" teaching purpose is the most important. In class, teachers should be good at inspiring students to think and encouraging students to ask questions or express their own opinions. Teachers are no longer limited to teach of knowledge in class, but also the organizer of academic exchange activities, the instructor of study and research activities and the examiners of academic level. The students become the lead role in the class and participate in the whole teaching process.

In class, teachers of European and American universities will widely use a variety of teaching aids, such as power point (PPT), slides and physical visits, to make the classroom teaching rich and varied. Moreover, besides the necessary advanced multimedia equipment in the classroom, the combination and placement of their tables and chairs are very characteristic. Many desks and chairs are flexible to move and can be combined into different learning styles. The teachers of European and American universities pay great attention to arouse students' enthusiasm and initiative. There will be a lot of preview and preparation before each class, so that every student is prepared already. It turns into listening class with questions, mainly about discussion and questions. Students often need to do more homework before class. In this way, the students' learning content is not limited to textbooks, but also is expanded to all the knowledge related to the course.
Many professional courses with practical and engineering applications in European and American universities are based on cases, so that students can discuss freely. Some students spend hours preparing for a class discussion, or even checking a lot of information. At the same time, students can form groups with a clear division of labor. Finally, the results are evaluated. The teacher's explanation is brief and to the point, but just to introduce the outline, students must learn to read by themselves so as to master the knowledge of the system. In class, the teachers organize the students to understand the knowledge. As a body, the students finish the process of study actively, while the teacher just assists in completing the process.

For European and American universities, the application of campus network in teaching is important. In some European and American universities, the arrangement, syllabus, and concrete plan of the curriculum can be found online. The school's website is the most important source of teaching information for both teachers and students. In order to promote students' active initiative, American universities will publish "teaching arrangements" on campus online at the beginning of the fall semester. Teachers will be able to preside over a whole course on the Internet, create a space, control or allow someone to access, post notes, release courseware, assign homework, provide exercises, correct students' papers, score and write reviews, refer to students' grades enrolled in this course, correct homework by E-mail, and can also send E-mail to students who are reluctant to ask questions in traditional classrooms.

In addition, there is also a specialized agency in some Europe and American universities that can provide consultation and service for the teaching methods of teachers. Some of them are called Center for Excellence in Teaching and Learning (Center for excellence in Teaching, U.C.D.), and some are called Center for Innovation in Teaching & Learning (Teaching Innovation Center, New York university of business) and some are called the Center for Instruction and Technology (the Center for guidance and Technology, the university of San Francisco's education college). What they have in common is that when teachers find out the problems in their classroom teaching and can seek for help, the agency can provide technical advices, psychological counseling, and teaching methods and so on.

**Exploration and Innovation of Full English Teaching Methods in Mechanical Engineering**

**Teaching of "Information Modernization"**

Teaching aids such as multimedia should be used thoroughly, so that students can understand the characteristics of the courses more intuitively, and can be stimulated in students' professional learning and interest in English teaching. At the same time, it is very necessary to continually strengthen the construction of Internet hardware and upgrading of technology, to train teachers in using education system, to make the campus network auxiliary teaching functions bigger and stronger, to construct the teaching resources platform, management platform and teaching communication platform. They can provide strong technical support for promoting the education quality of teaching of our school.

**Teaching of "Diversity Interaction"**

Teaching with the combination of lectures and students' discussion is very useful. Teachers should pay attention to the heuristic teaching through putting forward questions and discussion in groups, guide the students to find answer and help students to set up the team cooperation consciousness, form the effective autonomous learning strategy, gradually improve students' ability to analyze and solve problems and the ability of expression in English, and deepen the students' theory and language. Students positively participate in the whole process of teaching and advocate group activity teaching style. Usually teachers speak and discuss with students in class, including group discussions, collaborative authoring and collaboration presentations. We will deepen our understanding of the new concept and find solution to the problem through group discussion. This is mainly conducted by the teaching assistant, and each class is controlled by a dozen students to ensure that everyone can participate in the discussion. The scheme can be designed through collaborative creation, be involved with the use of new concepts and skills.
Genuine Knowledge Coming from Practice

The combination of theory and practice can improve teaching efficiency. Teachers can provide practical opportunities for students in various ways to improve students' ability of independent hands-on and designing experiments, and deepen their understanding of the theoretical knowledge of classroom teaching. The combination of classroom teaching and extracurricular teaching can improve students' English application ability. After studying theory knowledge systematically, it is good to recommend one or several references foreign language with the form of field reports, written reports to students, training their ability of language expression and writing.

Research Projects Promoting Teaching

As professional teachers in mechanical engineering, all of them are more or less hosting or participating in research projects related to their courses. They can extract "cases" from research projects and let students discuss freely. Especially the pre-class arrangement, it is very necessary to let students develop the consciousness of self-study and independent thinking, and consult a lot of information.

Strengthen the Introduction of Frontier Knowledge and Technologies

Mechanical engineering is an application subject based on natural science and technology science and has been developing rapidly. In order to guarantee the advancement of students' theoretical knowledge and technology, lecturers must always pay attention to the hot issues of subject development and the frontier knowledge and technical information. On the arrangement of curriculum contents, they timely draw the latest research results from paper, conferences, meetings both domestic and foreign countries, update teaching contents, widen students' knowledge, let the students have always been able to understand the trend of current academic and technical developments.

Summary

Accompanied with the process of globalization and internationalization, no matter from the perspective of the development of disciplines, scientific and technological progress and talent training, full English teaching is imperative, and it also conforms to strategic objectives of cultivating compound talents formulated by Ministry of Education.

Acknowledgments

This research was supported by the Academic Top-Quality Courses for Graduate Student in BIT (1-15).

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