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Bilingual Teaching Practice and Research of Introduction to Ecology in Physical Geography and Resource & Environment Discipline

Yarui WU*

College of Surveying and Mapping Science and Technology, Xi'an University of Science and Technology, Xi'an 710054, China

Abstract Bilingual teaching of Introduction to Ecology is a new teaching practice adapting to the demands of the times. This paper firstly introduced the selection of teaching objects and teaching materials of the Introduction to Ecology in Physical Geography and Resource & Environment discipline. It mainly discussed three teaching methods for bilingual teaching of ecology: participating interactive teaching, heuristic teaching, and diversified teaching. Besides, it analyzed classroom effect and feedback of students of the bilingual teaching of the Introduction to Ecology. Finally, it came up with constructive recommendations for implementation of the bilingual teaching of the Introduction to Ecology.

Key words Ecology, Bilingual teaching, Teaching reform

1 Introduction

The Physical Geography and Resource & Environment discipline in Xi'an University of Science and Technology is the former Resources Environment and the Management of Urban and Rural Planning discipline. In 2012, the Ministry of Education divided the Resources Environment and the Management of Urban and Rural Planning discipline into Human Geography and Urban-Rural Planning discipline and Physical Geography and Resource & Environment discipline. The Surveying and Mapping Science and Technology discipline selected Physical Geography and Resource & Environment discipline according to the discipline characteristics. This discipline extends the characteristics of the original Resources Environment and the Management of Urban and Rural Planning discipline, takes geography and environmentology as the main discipline direction and ecology and planning as related discipline direction, and opens backbone courses including physical geography, environmental science, ecology, cartography, remote sensing applications, and geographic information system. It is aimed at cultivating personnel having basic theory, knowledge and skills of physical geography and resources and environment, certain innovation ability and practice quality, and being able to engage in environmental monitoring, Environmental protection and evaluation, geographic information system, management of land and natural resources in departments of environmental protection, municipal administration, planning, tourism, and land and natural resources[1]. This discipline opens the basic course Introduction to Ecology for undergraduate sophomores. Through learning of this course, students can understand the relationship between biology and environment, and make clear the operation rules and mechanisms of ecosystem in nature. Thus, this discipline can effectively improve the understanding of students about global ecological environment, and lay a solid foundation for further learning the course. According to the requirements of the Ministry of Education, at least 5% - 10% of specialized courses in colleges and universities should adopt bilingual teaching from the autumn of 2001. The teaching of Introduction to Ecology just belonged to this scope. Based on this, I carried out the practice and exploration of bilingual teaching for Introduction to Ecology of Physical Geography and Resource & Environment discipline in Xi'an University of Science and Technology.

2 Purpose and significance of bilingual teaching of Introduction to Ecology

Bilingual teaching is a method of teaching in which teachers give lesions in native and foreign language for a non-foreign language course. Taking Chinese and English as example, bilingual teaching refers to using English teaching materials, English blackboard writing, English homework, English examination, and English oral teaching on the basis of Chinese teaching[2,3]. Therefore, in the bilingual teaching process, students are required to be proficient in the use of English for professional knowledge learning. At present, according to related survey and study of Physical Geography and Resource & Environment discipline, the overall English level of students seems having been improved, but due to confinement of traditional English learning methods and related examination. Students have better cognition of grammars and language rules, but they are weak in listening and speaking ability in practical application. This further restricts the learning and communication of students in using English. For example, students in our class have passed the CET4 or some even passed the CET6, but they are still weak in practical application in English. They still have difficulty in reading original English materials. Besides, they have to spend more time on searching English literature because the search words are not accurate. Therefore, in the courses of Introduction to Ecology of Physical Geography and Resource & Envi-

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* Corresponding author. E-mail: 157660815@qq.com

ronment discipline, bilingual teaching is in fact a better method. In the teaching process, I not only paid attention to the explanation of professional content, but also stressed the professional English learning, combined professional knowledge and language in an organic manner, guided students to learn professional knowledge, try to think with the mind of both Chinese and English, to effectively promote digestion and application of knowledge.

3 Practice of bilingual teaching of Introduction to Ecology

3.1 Selection of teaching materials The selection of teaching materials is the basis of teaching. First, the selection of teaching materials should meet the arrangement of syllabus and related standards of the course. Second, the scope of knowledge, content, and complexity should conform to professional knowledge level and English application ability of students in this discipline. Through comparing related foreign original textbooks, photocopied bilingual textbooks and domestic textbooks, on the basis of professional quality of students in this discipline, I selected *Ecology: Concepts and Application* (written by Molles. M. C) as main English textbook for bilingual teaching practice of *Introduction to Ecology*. Besides, I selected Introduction to Ecology (edited by Liu Peitong, Higher Education Press) as auxiliary textbooks, to help students make comparative learning, and maximally raise students' acceptance to professional knowledge through comparison of Chinese and English textbooks. In the post-class survey, more than 95% of the students believe that the simultaneous application of the Chinese and English textbooks can generate the effect of mutual promotion and mutual integration, so it is helpful for improving the learning effect.

3.2 Application of teaching methods

3.2.1 Participating interactive teaching. In Physical Geography and Resource & Environment discipline, the Introduction to Ecology is set in the second year of undergraduate course. At this stage, students have small English vocabulary and limited English level. Thus, directly using English to give lessons may lead to low acceptance of students, and will generally bring about deviation of certain concepts. In this situation, it is necessary to adjust teaching method, make effort to stimulate subjective initiative of students, bring into play their subjective awareness, encourage them to participate in classroom teaching, and take advantage of interactive method to obtain excellent teaching effect[4]. When introducing the concept of Introduction to Ecology, I firstly wrote the word "Ecology" on the blackboard, to let students guess root and meaning of the word. Through looking up the word in English dictionary, searching in mobile phone App, and discussion, students knew that the root of ecology came from Greek word "oikos" which means "residence" or "habitat", while the suffix "logos" has the meaning of "discussion" or "subject". They further summarized the meaning of ecology according to literal meaning of this word and had a better understanding of the English meaning "Ecology is the study of the relationships between plants, animals, people, and their environment, and the balances between these relationships". In the follow-up classes, I arranged English words involved in the next class, so that students could get familiar with and understand specific meaning of these words in the professional field. Through preview, students greatly improved their learning efficiency. In addition, I would regularly arrange some discussion topics, such as the composition and structure of the ecosystem, and safety issue of ecological environment. I guided students to discuss these topics. This not only makes students efficiently grasp main and important points of the course, but also makes teachers clearly know the comprehension of students about knowledge points.

3.2.2 Heuristic teaching. As the above mentioned, the ecology subject is closely connected with the development of human society. Thus, in the process of teaching, it is required to grasp basic theoretical knowledge, enlighten students to associate theoretical knowledge with various phenomena in life, and guide them to explain some problems in nature. When teaching the chapter "Biology and Environment", I posed two questions using classical episodes of the movie Titanic. The freezing Arctic water in the Titanic swallowed the lives of many people. Then, why blood and tissue in aqueous water can freeze into solid ice? Like human beings, polar ocean fishes are also life organisms. But why polar ocean fishes can survive at such low temperature? Students were very interested in such questions and had a lively discussion, and finally they understood the difference between polar ocean fishes and human beings. Polar ocean fishes can reduce the sensitivity to freezing through increasing the compound level in blood and tissue, to adapt to low temperature in the polar region. Based on this, after students learning this chapter, some physical properties of the biotic environment is detrimental to life, but organisms have developed their special solutions to many problems. In other words, they explored basic relationship and interaction between organisms and environment. Such heuristic teaching, supplemented with frontier knowledge of the discipline, is a useful improvement of outmoded teaching methods, makes the scope of the professional content become more comprehensive and novel, and students will feel more interesting and get more impressed.

3.2.3 Application of diversified teaching methods. In the process of bilingual teaching, it is necessary to take full advantage of the multimedia, Internet, and some new media platforms, to enrich the teaching methods, so as to further expand and extend the classroom teaching content. During teaching, I also arranged some English videos broadcasted in Discovery channel according to the course content, and combined videos such as Tropical Rain Forest and African Deserts with ecosystem in the textbook. Through watching such videos, students deepened their understanding of the classroom knowledge and also exercised their listening. Besides, with the aid of the new media platform WeChat popular with students, I shared some articles issued by WeChat public accounts, to introduce ecological environment issues rising

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trade does not necessarily bring the food security. The Roman Empire was dependent on food trade, but Egypt and other food production areas are part of the country and could not and would not refuse grain export. If a country's food security completely relies on the foreign trade, the food security will be tantamount to an air castle. To protect China's food security, in addition to a reasonable planning of agricultural structure, it is also required to ensure adequate grain yield, stabilize food price by macro regulation, guide the production and consumption, attach great importance to the construction of warehousing and transportation, and guarantee the distribution of food in both the space and the time. The weakness of Roman Empire in the construction of grain warehouse is a lesson worthy of attention. The grain reserve security is not only to ensure the volume of reserves, but more importantly it is required to ensure the quality of grain reserves and establish a sound reserve system.

5 Conclusions

Food is god for the people, and food security concerns the lifeblood of a country. The decline of once prosperous Roman Empire has many factors, but the food security is an essential one and should not be overlooked. At present, China has made considerable achievements in food security, but it must be aware of the serious overall situation, the foundation of grain security is still not firm. There is still a long way to solve the issue of China's food security and realize the balance between food supply and demand, and rationalize the food consumption structure.

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or to be studied both at home and abroad, to stimulate interests of students in scientific exploration.

3.2.4 Properly establishing bilingual teaching team. In the past, teaching of a professional course is a basically one-teacher responsibility system. However, there is the old saying that "one has his own areas of expertise". In the process of bilingual teaching of Introduction to Ecology, it is possible to break such one-teacher responsibility system and make proper establishment and optimize the distribution of the teaching team. According to the course content, I made certain arrangement of the division of labor. With leading of a teacher, I combined specialty of teachers in the department, and asked them to teach the contents they are good at. This greatly ensured the width and breadth of teaching contents and also whipped up learning interests of students.

4 Conclusions

The bilingual teaching of Introduction to Ecology of Physical Geography and Resource & Environment discipline, as a branch of the present bilingual teaching, can make students try a new teaching method in a lower grade, understand that professional knowledge can be learned in English, rather than simply or mechanically learn English. Use of Chinese and English textbooks also makes students come into contact with the frontier knowledge system, enrich and expand the field of professional knowledge, and lay a good foundation for future research and thesis writing and even study abroad. In order to realize the goal of cultivating "high quality compound talents with professional knowledge and proficient English" in the new century, it is still necessary to make further exploration of bilingual teaching mode, teach students according to their aptitude, and stimulate their learning interests, so that students and teachers will actively participate in the bilingual teaching activities.

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