

Bilingual Teaching and Curriculum Ideology and Politics under the Engineering Education Certification Concept of the Course Fundamentals of Packaging Technology

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Abstract. The course contents and objectives of "Fundamentals of Packaging Technology (Bilingual)" are determined based on the analysis of problems about course, teachers, textbook and students. The constructivist anchored teaching mode is used, which forms the teaching style of lecturing contextualization, situational gist, autonomic and cooperative learning, bilingual summarization, and generalization and application. This course adopts the blended teaching method, intersperses the keynote speeches after cooperative learning, integrates the ideological and political elements such as consciousness of rules and laws, political identification, patriotism, innovation consciousness, self-confidence in national culture, scientific spirit, and professional quality, and enhances the international perspective through extracurricular reading. The teaching and learning process includes preview before class, teaching in class and development after class. The teaching and learning in class form a paradigm including creating problem situations, core contents of teaching, autonomic learning, cooperative learning, and evaluation of achievements. The bilingual ideological and political teaching receives very good effectiveness and has promotional value.

Keywords: Fundamentals of packaging technology; bilingual teaching; ideological and political education; teaching style; teaching paradigm; teaching effectiveness.

1. Introduction

Engineering education advocates the basic concepts of student-centered teaching, outcome-oriented teaching and continuous improvement plan. Students have the initiative to learn, rather than being crammed by teachers. The outcome-oriented teaching requires that teachers should design the teaching objectives, course system and teaching evaluation system based on students' capability achievement. Specialized courses must be continuously improved to better serve to student' outcome.

The Chinese Ministry of Education proposed that we should deeply explore the ideological value and spiritual connotation in professional knowledge, expand the breadth and depth of specialized courses, and increase the humanity of courses, according to different characteristics of specialties. It is necessary for curriculum ideological and political education to be integrated into courses.

Fundamentals of Packaging Technology (Bilingual) is taught in bilingual languages in Shaanxi University of Science and Technology (SUST). It has won the Shaanxi Provincial Excellent Course (2005), Shaanxi Provincial Bilingual Demonstration Course (2008), National Excellent Course (2007) and National Bilingual Demonstration Course (2010). Since 2000, the course team has closely focused on the novel teaching concepts, especially the "emerging engineering", and carried out the course construction with the goal of forming the high-quality course, by integrating the concepts of engineering education certification and ideological and political education.

2. Analysis of Teaching Situation

2.1 Problems in Teaching

The bilingual teaching of this course has high requirements for course, teachers, textbooks and students. There are still many problems under the situation of lacking English environment [1].

2.1.1 Students' English level is uneven

The students' English entrance scores varied greatly, and their English ability is uneven. Their listening, speaking, reading and writing abilities are different. Due to the poor connection between public and professional English, it is difficult for students to adapt to the bilingual teaching mode.

2.1.2 Lack of textbooks suitable for bilingual teaching

There are few English version textbooks suitable for the bilingual teaching of this course. Teachers mainly use the published English articles and textbooks.

2.1.3 Insufficient teachers

Bilingual teaching requires teachers to master disciplinary knowledge systematically and have clear pronunciation and expression. The number of teachers in the Packaging Engineering Department of SUST meeting the bilingual teaching requirements is still small.

2.1.4 The teaching quality needs to be further improved

Firstly, the teaching objectives are not clear enough, and the necessity of English as a learning medium should be defined. Secondly, bilingual teaching requires the combination of theory and practice, and the course form and content should be rich. The effective connection between theoretical and practical courses is still lacked, which isn't conducive to the improvement of teaching quality.

2.2 Analysis of Learning Situation

Fundamentals of Packaging Technology (Bilingual) with the class hours of 32 hours is mainly offered to junior undergraduates of packaging engineering in Autumn semester. The annual student number is more than 60. The relevant course resources are currently used by Tianjin University of Science and Technology, Jinan University, etc., with an annual audience of more than 500 students.

2.3 Teaching Content and Objectives

For this course, the following knowledge, ability and value objectives are as follows:

(1) Students establish the development concept of lightweight, recyclable, degradable, and green sustainable packaging to enhance the sense of political identification, and understand the food and medicine packaging to enhance the law consciousness, by grasping the relevant knowledge of packaging history and function, sustainable development, packaging laws and regulations.

(2) Students' patriotism is cultivated, by grasping the knowledge of packaging materials and containers, packaging dynamics and transportation packaging, and integrating China's logistics packaging development mode.

(3) Students grasp the knowledge of packaging technology and machinery, and packaging research and development, enhance the self-confidence in national culture by integrating the important contributions of Chinese scholars on the evaluation methods of material cushioning performance, establish the scientific spirit by understanding the research and development technology of sustainable packaging, and strengthen their innovation consciousness and professional quality by introducing novel packaging technologies such as cold chain packaging and intelligent packaging.

(4) Students have the ability of oral communication and writing under the cross-cultural background (with different mother languages), know the packaging frontier, and enhance their international perspective through comprehensive comparison of packaging problems.

2.4 Textbook Analysis

The textbook was written by Manru Chen and published by the Chemical Industry Press in 2016 for the bilingual teaching of this course. This textbook has won the third-class prize of the Second China Light Industry Excellent Textbook Award, and the 13th/14th Five Year Planned Textbook issued by the Light Industry Education Instruction Committee of the Chinese Education Ministry.

The situational knowledge units of this course were based on the work process required for packaging research and development of packaging engineers, by carrying out the teaching designs of professional knowledge and specialized English, and compiling the textbook in combination with the development of packaging industry. This textbook has wide contents, including the four units of packaging overview, packaging materials and containers, packaging dynamics and transport packaging, and packaging technology and machinery, and covers the lessons of packaging history, basic packaging functions, paper and cardboard, corrugated cardboard boxes, metal packaging containers, glass containers, plastic packaging, flexible packaging composites, closures, impact, vibration and compression, mechanical impact, LANSMONT six step method, transport packaging, test method of product fragility, stress energy method for determining cushioning curves, liquid filling, dry filling, applied packaging (I), applied packaging (II), and packaging research and development.

Some ideological and political elements can be seen in this course related to the resources, environment, standards, laws and regulations, national strategy, emerging engineering, research contributions of Chinese scholars, new packaging development technologies, packaging frontiers, etc.

3. Teaching Strategies and Styles

3.1 Teaching Mode

The constructivist anchored teaching mode [2] is mainly employed for the teaching of this course, which is also called the mode based on cases or problems. The teaching style of lecturing contextualization, situational gist, autonomic and cooperative learning, bilingual summarization, and generalization and application has been formed. The lecturing contextualization is to reproduce the situation of packaging engineering in lecturing by combining the working scene and experience of packaging technology; The situational gist is to refine the core content of lecturing contextualization to form the key points of each chapter; The autonomic and cooperative learning is to set a real problem situation through cooperative learning, determine the corresponding work tasks to be solved, and display final achievements, to make students feel being brought into them, and to enhance students' enthusiasm and sense of gain in learning; The bilingual summarization is to use classical sentence patterns to carry out bilingual interpretation, to express in another way, and to form a bilingual application mode of summarization-analysis-re-summarization; The generalization and application is to integrate new contents in professional fields to form ideas, viewpoints and arguments through the process of extraction, condensation, and summarization, by imitating sentences in combination with classical sentence patterns, so as to make students express them orally. Therefore, this teaching style refers to the English learning if the imitation of classical sentence patterns is emphasized; It is the teaching of professional knowledge if the analysis of core contents is emphasized.

3.2 Teaching Methods and Means

For this teaching style, the teaching methods and means are introduced as follows.

3.2.1 Blended teaching

The online Superstar teaching platform is used to assist offline classroom lecturing, complete preview before class, call the roll, answer questions, and finishing usual assignments, group tasks,

online learning, assessment and evaluation, to improve students' learning efficiency and participation.

3.2.2 Keynote oral speeches

Under teacher's guidance, students select some topics from the key points of chapters, read relevant English materials, form the ideas, viewpoints and arguments, and write a short essay with a speech time of about 3 minutes and usually 200-300 words, in the way of group cooperative learning. Then the students make a skillful speech in not more than 3 minutes, and submit the recorded speech to the Superstar Xuexitong application. Finally, the teacher marks it to form one process assessment.

3.2.3 Ideological and political teaching of "class in class"

Curriculum ideology and politics can be integrated into the course teaching [3,4]. Packaging overview involving packaging laws and regulations, makes students understand the requirements of food and medicine packaging to enhance the law consciousness; Packaging materials and containers, involving resources, environment and standards, guides students to establish the sustainable packaging development concept, to enhance their sense of political identification; Packaging dynamics and distribution packaging, cultivates students' patriotism, in combination with the Chinese development model of packaging logistics under the "the Belt and Road" strategy; Packaging machinery and technology, in combination with the "emerging engineering" involving new technologies of cold-chain and intelligent packaging to enhance students' innovation consciousness; Packaging research and development, enhances students' self-confidence in national culture, by introducing the Chinese scholars' contributions on the evaluation methods of material cushioning performance, and cultivates students' scientific spirit and innovation awareness, by involving the development of lightweight, green, intelligent, recyclable and sustainable packaging.

3.2.4 Extracurricular teaching

The extracurricular reading guides students to know the frontier of international packaging, view the packaging problems objectively, and enhance international perspective. Packaging English Society are instituted in SUST to carry out various activities to assist in the learning [5].

4. Paradigm and Practice of Teaching Process

4.1 Preview before Class

To cultivate students' self-study ability, the teacher initially assigns preview tasks incorporated into the process assessment. Students enter the Xuexitong application to preview the related resources.

4.2 "Teaching and Learning" in Class

The paradigm of "teaching and learning" in class mainly includes the following five phases.

4.2.1 Creating problem situations

The teacher firstly throws out questions of each chapter, creates problem situations, and presents them in the form of micro-class videos for students' preview. For example, the key questions of Lesson 1 are: (1)Although packaging has existed from primitive times, the Industrial Revolution is generally taken as the time when modern packaging was born. What were the changes that lend validity to this statement? (2)Why is food loss so high in less-developed countries? (3)Why is the United Nations so interested in packaging? (4)The four Rs are used as the guiding principles for managing the waste problem. What are the four Rs, in the correct order? (5)What are the two major divisions within the packaging industry? After watching the micro-class videos, students can know about the relevant key points and questions, which students will take to listen to the lecturing.

4.2.2 Course core contents

During the lecturing, the lecturer once again clarifies the key points of the lesson, around which the relevant lecturing content is organized. For example, in combination with the above key questions, the content of the Lesson 1 is: (1)What is packaging? (2)Primitive packaging; (3)From Rome to the Renaissance; (4)The industrial revolution; (5)New packaging roles; (6)Packaging in the 20th century; (7)Modern packaging; (8)Waste management and environmental issues; (9)Modern packaging industry. During the lecturing, the teacher conducts students' brainstorming after throwing these questions. Students can think about them individually or discuss them in groups, and participate in "snap answers" through the Xuexitong application. They firstly construct the answers to the questions, and then further confirm the answers during the lecturing.

4.2.3 Autonomic learning

At the end of each class, the teacher issues the online assignments of learning tasks through Xuexitong application. Students learn the relevant contents by themselves and construct the answers. For the oral assignments, students rehearse in advance.

4.2.4 Cooperative learning

Students' English listening and teamwork spirit are cultivated through cooperative learning, for which the students are required to complete a certain number of learning tasks in groups, by using the group task module of Xuexitong application. General characteristics of each learning task are: (1) Each task covers wide content, and requires reading enough English materials; (2) Each task is presented in the form of comprehensive question with no fixed answers. (3) Team members comprehensively discuss it from different aspects, and complete it through team cooperation.

4.2.5 Evaluation of learning achievements

To confirm whether the students have achieved the teaching objectives, it is necessary to evaluate their achievements from three aspects: knowledge, ability and morality [6,7]. The assessment methods include performance in class, chapter quizzes, group tasks, comprehensive assignments, final exams, etc.

The evaluation of students' basic English expressions on the packaging technology, is mainly achieved by performance in class and final examination. The evaluation of students' mastery of materials, logistics, research and development, environment, sustainable development, policies, laws and regulations is mainly conducted through chapter quizzes and final examination. The evaluation of students' ability to communicate orally and express in writing, is mainly through group tasks, oral assignments, final examination, etc. The students' scientific spirit and professional quality are mainly through mutual evaluation among students; students' sense of political identification, patriotism and self-confidence in national cultural are through the performance in English conversation simulation; students' consciousnesses of laws and innovation are through case discussion.

4.3 Development after Class

The rich and varied activities after class contribute to the realization of the course value goals. The students have established an interest-oriented professional association - Packaging and English Society where they organize and participate in various activities, such as studying packaging knowledge and packaging damages, packaging enterprise visits, packaging expert lectures, packaging knowledge competitions, packaging enterprise simulation career fairs, etc. Through these activities, students consolidate their knowledge and strengthen their ability to organize and communicate.

5. Teaching effectiveness and Summary

For the teaching effectiveness of this course in the past two semesters, a questionnaire survey was carried out. As seen in the survey results, 98.5% of the students think it is necessary to learn this course; 87.3% of the students think that the course objectives are distinct and reasonable; 82.1% of the students understand the social contributions and responsibilities of packaging engineers, 85.5% of the students understand the requirements of packaging professional ability and quality, and 87.6% of the students think their English ability has been improved. It's shown that course integrating ideological and political elements has the following advantages over traditional bilingual courses.

The integration of ideological and political elements into the course, can not only encourages students to seek knowledge and learn to do things, but also help students to learn to survive and behave [10]. This integration achieves the following effects over traditional bilingual courses: (1)improving students' employment competitiveness; (2)enhancing students' confidence and interest in learning English; (3)realizing the increment of course morality value.

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