

Teaching Method Reform of Professional English Course for Measurement and Control Major under New Engineering Education Background

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ABSTRACT

Training new engineering talents is an inevitable trend of new engineering education in colleges and universities. However, under the background of new engineering construction, the teaching method of traditional professional English course for measurement and control major are limited by problems, such as narrow teaching task, single teaching process, closed teaching, and backward theories in teaching materials. As a result, the traditional professional English teaching method can't meet the construction requirements of the integration of production, learning, research and teaching of the new engineering. This paper proposes a new teaching method which takes the industry as the background, students as the main body, research as the means and teachers as the guidance, adding teaching content and reforming the evaluation method. It provides a new way of cultivating new engineering talents.

Keywords: *new engineering education, professional English course, Measuring and controlling technology and instrument, teaching method*

1. INTRODUCTION

The new engineering talents with the ability of innovation, entrepreneurship and cross-border integration and the cultivation of such talents are needed urgently in the rapid development of the new economy [1]. In today's intelligent era, new engineering talents, from the perspective of professional ability, should be able to adapt to and lead the future technological and industrial revolution. They should be equipped with solid basic theory and professional knowledge, lifelong learning ability and practical ability, and creative thinking [2]. Therefore, the requirements of interdisciplinary integration and professional crossover are put forward for the cultivation of new engineering construction talents. In order to carry out the training of new engineering talents, colleges and universities need to reform the traditional training mode and create a new training path [3]. In view of the requirements of discipline integration and cross-disciplinary training, the way of professional training should be changed from the traditional professional course learning to the deep integration of production, learning, research and teaching. Namely, take students as the main body, learning as the centre; take research as a means; be guided by teachers to implement the cooperative practice of "production, learning, research and teaching" as a community [4]. This cultivation approach not only aims at the overall cultivation of the major, but also puts forward the cultivation requirements for the construction of courses within the major [5].

As a basic course of major *measurement and control technology and instrument*, professional English for measurement and control major is of great significance in the cultivation of professional talents. At present, professional knowledge is not confined to the classic theories in textbooks, but also exists in the cutting-edge knowledge of the subject that needs to be understood through information search. For the major of *measurement and control technology and instrument*, whether it is the most cutting-edge professional research, or on behalf of top level of instruments and devices and other industrial products, the relevant technical data are illustrated in English, a unified and international language and published via Internet. Therefore, professional English has become an essential tool to understand and even master the most innovative and cutting-edge professional knowledge. The requirements for new engineering talents —“adapt to and lead the future technological revolution and industrial revolution”, “lifelong learning ability and practical ability, creative thinking” are crucially important [6]. The construction of new engineering course and the cultivation of talents put forward new requirements for the teaching mode and training target of professional English for measurement and control major.

But for now, there is a gap between the traditional training mode and training requirement for new engineering education. The gap is mainly about,

(1) Teaching content. In the traditional syllabus of professional English for measurement and control major, students are required to master and apply professional foreign language vocabulary and translation techniques, master the characteristics and translation methods of

professional foreign language, and read and translate professional materials and scientific papers accurately and fluently. According to the teaching task, the teaching content emphasizes the difference between professional English and ordinary English, highlighting the use of professional English grammar, vocabulary and so on, taking professional English as a special language, and learning it from the theory. For the application of professional English, the teaching task mainly focuses on the translation and reading of professional materials. However for training new engineering talents with creative thinking, it is necessary to vigorously explore the frontier knowledge of the subject [7]. Professional English, as a basic tool to directly explore the frontier of the subject, should be taken out of teaching content, such as paying too much attention to the characteristics of professional English language and being limited to cultivating professional abilities such as reading and translation. It is necessary to make full use of the advantageous tool of professional English to supplement the teaching content with "mastering a certain degree of frontier knowledge of the subject".

(2) Teaching method. The teaching process of traditional professional English is similar to that of ordinary English courses. First, the grammar or vocabulary points are introduced. Second, by explaining the new words of the popular science essay, intensive reading and translation of the full text, learn the specialized vocabulary of measurement and control major and the construction, writing and expression characteristics of professional English. However, this teaching process focuses on the explanation of the methodology of professional English language. According to the requirements of new engineering talents, the traditional teaching method is relatively closed and single, and should develop diversified teaching links. Teaching content referred to the frontier knowledge of the subject should be included in the teaching process. The teaching process should not be limited to language learning, but use language to broaden students' professional horizon and make the teaching process open and diversified.

(3) The design of textbook. The contents of textbook of professional English for measurement and control major are similar. The grammar of professional English is taken as the focus of the teaching, accompanied by the explanation of the grammar of professional science essays. Most of the popular science essays involved in textbooks are related to the basic professional theories of measurement and control. In terms of professional development, they belong to the most classic basic theories, which are far from the cutting-edge technologies and scientific theories of the current major.

According to the points above, as a result, professional English cannot meet the requirements of the integration of "production, learning, research and teaching" of the new engineering course, and the teaching mode of the course needs to be further improved comprehensively.

A comprehensive teaching mode in view of the existing problems in the current professional English course of measurement and control major was explored. According

to the requirements of new engineering, new course objectives are established and the degree of achievement is calculated in this paper.

2. METHODOLOGY

2.1. Theory

Combined with the specific content of "production, learning, research and teaching", the teaching construction of professional English course for measurement and control major should meet the following requirements:

(1) The teaching background should be the instrument technology industry corresponding to the measurement and control major. The background of instrument science and technology industry includes not only the relevant theories and manufacturing of market-oriented instruments, but also the research and development of new instruments, the manufacture of new instruments, the optimization of instrument performance, the innovation of measurement methods, the perfection and improvement of measurement evaluation theory and other relevant contents. Therefore, the teaching content should include the understanding and mastery of the development background, development prospect, new technology, production process, product description and product application of related products and technologies in the instrument industry. In the course of professional English teaching, the cutting-edge content knowledge of measurement and control industry should be introduced, and key teaching should be conducted on the retrieval of industrial information, industrial advanced products, professional terms of new technology, professional application and other contents.

(2) Take students as the main body and learning as the center. During the undergraduate teaching period, professional English course for measurement and control major is usually in the second semester of the junior year or the first semester of the senior year. The reason for setting courses at this time is that students have basically completed the basic professional theory courses of their major and have a certain professional foundation so that they can carry out in-depth professional learning. Students are going to pursue further study or a professional career. For students who plan to pursue further education after graduation, pre-Bachelor training of professional skills should be introduced, such as retrieval of scientific papers, reading skills of scientific papers and writing skills of scientific papers. For students who are preparing for professional career, teaching content such as English resume making, interviewing skills in English, reading product manuals, and business email correspondence should be included.

(3) Use scientific research as a means to promote professional learning and broaden the depth and breadth of professional learning. The publication of scientific and technological papers is an important form to embody the research results. Therefore, while emphasizing research, it

is necessary to fully do the research, reading and writing of scientific papers and other related teaching work. In the process of scientific research, attending academic meetings is an effective way to expand research ideas. Mastering the communication skills of academic conferences will be of great benefit to students in both scientific research and professional work in the future. Therefore, relevant content such as English PPT presentation of professional content and English explanation skills of professional content should be added to the reform of teaching mode of professional English for measurement and control.

(4) Utilize teachers' subjective initiative and make full use of teachers themselves as a teaching resource. College

teachers generally have obtained a doctor's degree and have considerable scientific research ability and professional abilities. By combining teachers' scientific research experience and professional experience with courses, and introducing cutting-edge knowledge of the subject into the classroom, the teaching resource of teachers' can be applied. In the exploration of professional English teaching mode, teachers can add their understanding and introduction of scientific research topics to broaden students' professional horizon and arouse students' thinking.

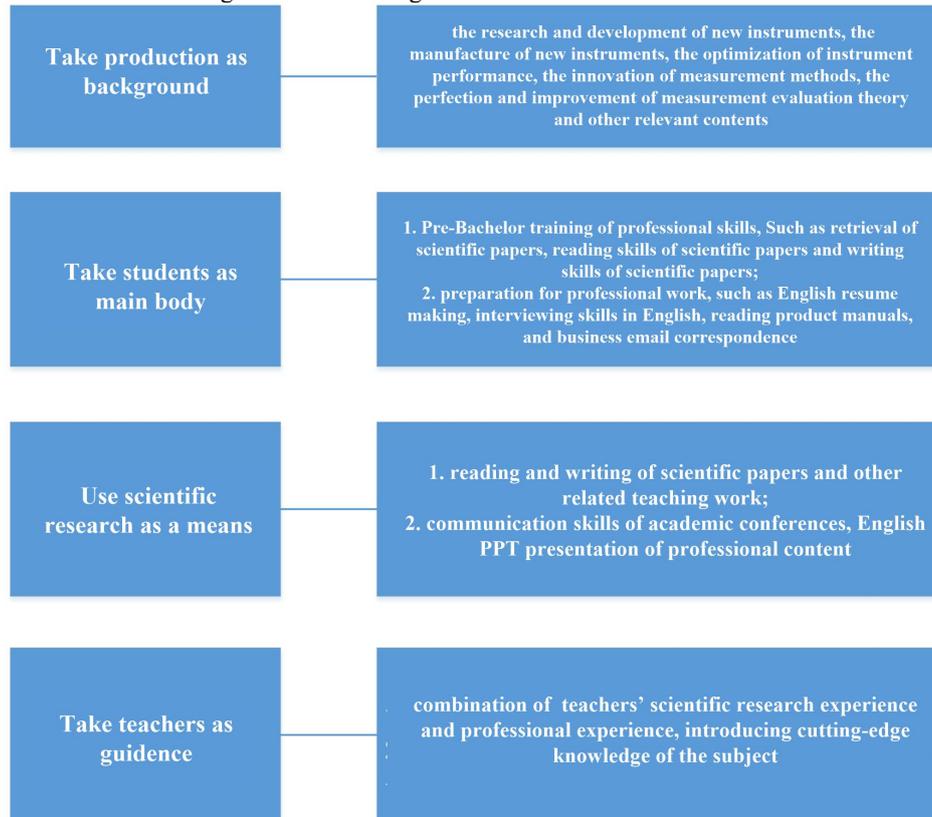


Figure 1. Teaching Method Reform of Professional English Course for Measurement and Control Major under New Engineering Education Background

2.2. Implementation

Through new engineering construction under the background of "production, teaching" depth fusion of training methods, professional English course for measurement and control major from "production", "learning", "research", "teaching" four aspects, adjust the teaching content, including: professional English foundation, apparatus, product specifications, components English datasheet, English, science and technology thesis, academic report, English business emails, professional resume in English, English professional interview and related content.

The content setting of the teaching materials related to the above teaching contents, the degree of students' mastery required and the assessment method are shown in Figure 2. In Figure 2, the degree of mastery is represented by stars, three stars mean proficiency, two stars mean understanding and mastering, and one star means understanding and mastering as much as possible. The assessment methods are mainly divided into exams, assignments, classroom questions and oral presentation. (1) The examination is the final written examination. (2) Assignments are set in class, completed by students and evaluated by teachers after class. (3) Classroom questioning refers to the random questioning of students in class. (4) the Oral presentation is the key of teaching

reform. Students are required to retrieve the scientific paper, the key words of which are specialist vocabulary. After reading through the article, the oral presentation is

about to display the scientific thoughts and the translation of abstracts. After the oral presentation, students are taken questions from the teacher and the audience.

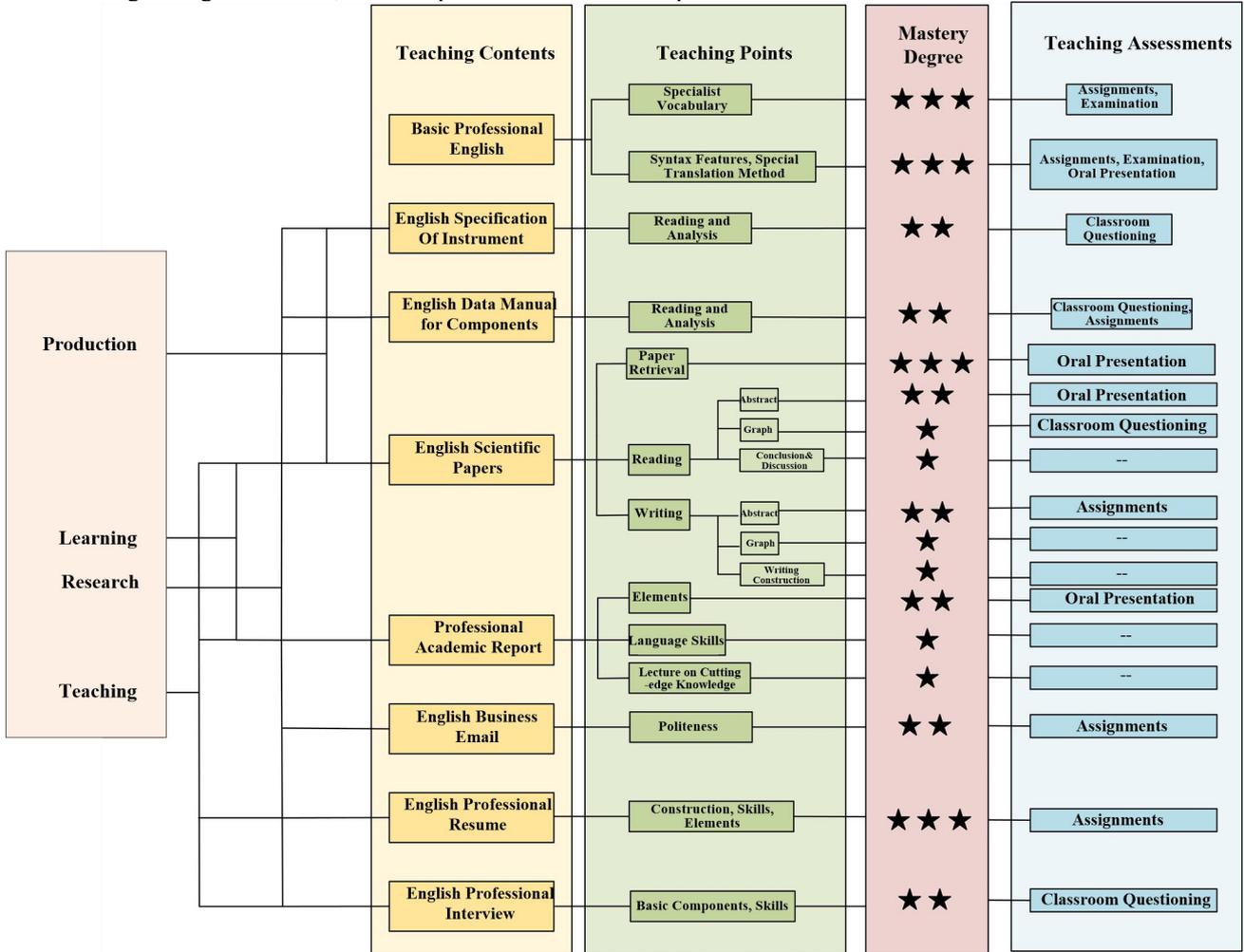


Figure 2. The degree of students' mastery required and the assessment method

2.3. Evaluation

In the course of teaching measurement and control professional English to students of 2017 majoring in measurement and control technology and instrument in Tianjin Agricultural University, the professional English teaching method under new engineering background is adopted. The teaching process proposed in this paper is implemented. According to the evaluation result, the degrees of the course goals are shown in Table. 1.

Conversion point: The conversion point value of students' score in this part of the total score is between 90%-100% (including 90%) and is 5; the conversion point between 75% and 90% (including 75%) is 4; the conversion point between 60% and 75% (including 60%) is 3; the conversion score between 30% and 60% (including 30%) is 2; The conversion score between 0% and 30% is 1. The calculation of degree of goal is

$$\sum \frac{\text{score} \times \text{number to achieve this score}}{\text{total number}} \quad (1)$$

Table 1. The degrees of the course goals

	Number of students	Average score/total cent	The number of scores account for 90% to 100% of the total score	The number of scores account for 75% to 90% of the total score	The number of scores account for 60% to 75% of the total score	The number of scores account for 30% to 60% of the total score	The number of scores account for 0% to 30% of the total score	Achievement of goals
Basic Professional English	51	43.2/60	54-60	45-54	36-45	18-36	0-18	3.2
			5	4	3	2	1	
			0	19	21	11	0	
English Specification of Instrument	51	3.1/4	3.6-4.0	3.0-3.6	2.4-3.2	1.2-2.4	0-1.2	3.6
			5	4	3	2	1	
			10	17	16	8	0	
English Data Manual for Components	51	3.3/4	3.6-4.0	3.0-3.6	2.4-3.2	1.2-2.4	0-1.2	4.3
			5	4	3	2	1	
			14	19	15	3	0	
English Scientific Papers	51	6.4/8	7.2-8	6.0-7.2	4.8-6	2.4-4.8	0-2.4	3.5
			5	4	3	2	1	
			9	17	15	10	0	
Professional Academic Report	51	11.9/15	13.5-15	11.3-13.5	9-11.3	4.5-9	0-4.5	3.6
			5	4	3	2	1	
			9	18	17	7	0	
English Business Email	51	2.6/3	2.7-3	2.3-2.7	1.8-2.3	0.9-1.8	0-0.9	3.9
			5	4	3	2	1	
			15	19	16	1	0	
English Professional Resume	51	2.7/3	2.7-3	2.3-2.7	1.8-2.3	0.9-1.8	0-0.9	4.0
			5	4	3	2	1	
			17	18	15	1	0	
English Professional Interview	51	2.5/3	2.7-3	2.3-2.7	1.8-2.3	0.9-1.8	0-0.9	3.7
			5	4	3	2	1	
			14	16	15	5	0	

2.4. Discussions

In the teaching content of English Specification of Instrument, English Data Manual for Components, English Scientific Papers, Professional Academic Report, English Business Email, English Professional Resume and English Professional interview, the degrees of the course goal are relatively high.

3. CONCLUSIONS

A new professional English teaching method for measurement and control major is proposed in this paper. By integration of production, learning, research and teaching under the background of new engineering, the teaching contents, teaching methods and assessment methods are reformed. After the implementation of new teaching methods on students majoring in Measurement and Control Technology and Instrument in Tianjin Agricultural University, the evaluation result is obtained. By analyzing the degree of achieving the curriculum goals,

the students achieved good results in English specification of instrument, English data manual for components, English scientific papers, professional academic report, English business email, English professional resume and English professional interview and other aspects, and obtained a higher degree of achieving the course goals. This teaching method enriches the teaching content, makes the course examination more diversified, and provides a new training way for cultivating new engineering talents.

ACKNOWLEDGMENT

This work was supported by Research and reform project of undergraduate education and teaching in Tianjin Agricultural University (2018-A-14, 2018-A-17).

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