

# Research on Teaching English Civics in Electrical and Mechanical Engineering Based on Industrial College

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**Abstract:** Professional English is an important professional course, which should guide students to establish the correct outlook on life and values in terms of value leadership. The professional English of electromechanics, mainly mechanical and electromechanical professional vocabulary, takes into account the electronics, automation, intelligent manufacturing and other specialties. In this paper, we naturally combine the content of Civics with the course of Professional English, integrate moral education into the teaching of Professional English, and adopt a project-driven training mode on the platform of Industrial College to educate students to establish correct values. It is of great significance to improve the professional quality and craftsmanship of engineering students, and also provides a basis for the construction of curriculum Civics in colleges and universities.

**Keywords:** Professional English; Curriculum Civics; Project-based teaching; Industrial College.

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## 1. Introduction

Professional English is an important professional course, which aims to make students proficient in professional basic vocabulary, master the characteristics of professional English writing, be able to read professional English literature proficiently, master certain translation skills, translate English-Chinese and Chinese-English proficiently, be able to read and translate scientific and technical articles of this profession more fluently, be able to seek solutions to engineering problems and their alternative solutions through literature research, have certain They can read and translate scientific and technical articles in their specialties fluently, seek solutions to engineering problems and their alternatives through literature research, and have certain ability to write scientific and technical papers in English, and broaden students' international vision and foreign language application ability to some extent. As an important professional course, professional English should go in the same direction with the Civic Science course to guide students to establish correct outlook on life and values.

Feng Li proposes the practice of "immersion" in teaching ideological and political theory courses in colleges and universities. An Xiumei proposes that enhancing English teachers' awareness and ability of thinking politics is an effective way to realize the function of "thinking politics in the curriculum" of College English. Zheng Xuejing practices the course thinking politics in the teaching of English for Polymer Materials. She teaches from the summary of professional vocabulary head word roots, multiple meanings, similar words and word expansion. Xu Jinfen has used the three steps of "Analysis-Screening-Additions" to explore and expand the Civic Science elements of the existing English teaching materials. In the teaching practice, Gu Shengli built a professional English teaching content system based on discipline integration, built a teaching platform that fits with it, innovated the teaching process and reformed the evaluation mechanism. According to Huang Guowen, English teaching is composed of six elements, which are inseparably connected with each other; the two main questions are "what" and "how

to do".

Professional English involves a wider range of professional knowledge, which requires students to have not only a good foundation of English but also good professional knowledge. The cross-fertilization of mechanical and electrical disciplines takes the integration and cross-teaching of undergraduate students in mechanical, electrical and electronic majors as the starting point, aiming to cultivate high quality composite senior talents with engineering consciousness, innovation consciousness and comprehensive ability of engineering practice. It breaks the boundaries of inherent disciplinary fields, carries out the reform and exploration of experimental teaching of professional cross-fertilization, and forms the engineering talents cultivation mode reflecting the deep cross-fertilization of mechanical and electrical disciplines. Among them, the electromechanical class "Professional English", the content covers machine tools, hydraulic transmission systems, electromechanical transmission control, CNC machining technology, types of CNC machine tools, flexible manufacturing systems, robotics, expert systems, computer-aided process design, etc. As well as the cutting-edge knowledge about mechanical and electronic at home and abroad, such as bionic robot, artificial intelligence, etc.

## 2. Main problems

Professional English is difficult to learn, and at the same time combined with Civic Education, the main implementation difficulties are as follows: (1) The course involves a large amount of professional English vocabulary, extensive knowledge, difficult points and other characteristics make students feel overwhelmed, boring and difficult to understand. Professional vocabulary is very long and difficult to master if not combined with special word formation and mnemonics. (2) The learning of professional English should be based on professional knowledge. The professional English of electromechanics is mainly based on the vocabulary of mechanical and electromechanical specialties, taking into account the specialties of electronics, automation

and intelligent manufacturing. Students can only do half the work with half the effort if they have good basic knowledge of mechanical engineering as a prerequisite. Cross-fertilization of disciplines is needed. (3) Many long and difficult sentence structures. The sentences of professional English textbooks and online materials are too long and complex. It takes a lot of time for learners to quickly and accurately identify sentence patterns and classify sentence components in reading. (4) How to educate people. The main difficulty is that teachers combine educational purposes, integrate educational situations, and use activities as a carrier to shape students' worldviews and values through interactive communication between teachers and students.

### **3. Specific strategies**

#### **3.1. Course characteristics**

The English course in university is generally divided into two stages: the first and second year of university is the teaching stage of basic English, and after the third year, the professional English course will be offered. Basic English is the guarantee of learning professional English, and professional English is one of the important purposes of learning basic English, and the two are mutually dependent on each other. However, because of its professionalism, logic and accuracy, Professional English is very different from Basic English and English for daily life in terms of vocabulary and sentence structure. The large concentration of professional vocabulary and the large number of long and difficult sentences make professional English more difficult. The purpose of professional English is to make a problem clear. Therefore, professional English is clearer, more concise and clearer in reference.

The teaching of professional English focuses on reading and translation, and requires a lot of reading to achieve a correct understanding of the original text, which is determined by the practical needs of the previous use of professional English. To do scientific research, scientists need to consult and translate a lot of English materials. Since the translation of professional English is often directly applied to engineering, it has higher requirements for quality. Therefore, professional English attaches great importance to reading and translation. However, with the trend of globalization and the increasing international communication, our researchers are required to be able to read, attend international conferences, understand English speeches, write English papers, read their scientific papers in English, communicate with international people in English about their profession, etc.

#### **3.2. Approach**

Professional English takes the content of Civics of the curriculum as the core, combines with the goal of education, and implements the "subtle" Civics teaching. The elements must come from the teaching content itself. Professional English is a compulsory course at the stage of professional education, and it needs to go in the same direction with all professional courses, so as to cover the elements of thinking and politics. There are three sequential tasks for mining nurturing elements in foreign language teaching contents: understanding nurturing goals - analyzing teaching contents - designing classroom teaching programs. First of all, teachers should have a deep understanding of nurturing goals. There is a hierarchy of nurturing goals, which can be roughly divided into four levels. The first level includes national, school and

departmental nurturing goals; the second level specifically refers to the general goals of professional education; the third level refers to the goals of professional English courses; and the fourth level refers to the unit teaching goals of courses. In the four levels of goals, the goals of the previous level include the goals of the next level. When teachers design specific classroom teaching objectives, they must be in line with the upper-level objectives. On the basis of an all-round understanding of the nurturing goals, they analyze in depth the content they are teaching. Thinking elements are usually embedded in the teaching input materials, and may also be implicit in the practice activities. The key strategy is to be "silent". It is not an add-on, labeled lecture. Start with the content, fully explore the nurturing elements, and carefully design lesson plans to reinforce students' cultural beliefs through subtlety. In the process of interacting with students, teachers continue to improve themselves and teach by example, so that students can strengthen the effect of self-discipline.

#### **3.3. Excavating Civic Political Elements**

Optimize the Civic and Political elements of the Professional English course and reorganize teaching resources. Rewrite the content that naturally integrates with professional English. Combine the content of Civics with professional knowledge and make a natural transition, so as not to dilute the theme of professional lectures. For example, the original content of "Industrial Robotics" is replaced by "The latest scientific research achievements of Chinese Academy of Sciences - Space Robotic Arm Technology", which has a high degree of overlap in professional vocabulary and similar professional fields. The excerpt of "Space Robotic Arm Technology", which is the latest scientific research result of Chinese Academy of Sciences, is a natural combination of professional knowledge and political education, which is perfectly integrated into professional English teaching.

Integrate the Civic and Political elements of the course "Professional English" and deepen the teaching resources. In-depth study of socialist core values to enhance the sense of identity and mission of the course Civics. Dig deeper into the moral education elements of the "Professional English" course from different levels.

Expand the ideological elements of the course "Professional English" and enrich the teaching resources. Teachers should also implement corresponding infiltration and penetration for the guidance of ideas outside the classroom. In terms of teaching content, teachers should also continue to incorporate teaching activities related to the first classroom, such as recitation and lecture activities around the construction of special clubs, and sharing famous lines from traditional Chinese culture.

#### **3.4. Teaching focus**

Teaching requires authenticity. First, the teacher's true belief in the theory. As a teacher, true belief in the content of the course Civics is the basic prerequisite to firmly explain and spread it. Second is the teacher's genuine faith in students. Specifically, in the teaching, mainly reflected in the sincere and patient to students dutiful, with this sincere and patient, teaching will be harmonious and harmonious. Third, the teacher's true love for the curriculum. The teacher's true faith in the theory and sincere love for the students are put into practice, and the ultimate expression is the true love for the curriculum.

Digging Chinese stories to strengthen responsibility. There are a lot of Chinese stories in the professional English course thinking and politics, so it is reasonable to dig and refine the course thinking and politics elements, which can not only make the course thinking and politics content and knowledge points achieve the effect, but also enhance the attractiveness of teaching and training students' sense of responsibility. For example, when studying the article "BYD transformed the production line to make masks", not only do we learn professional English knowledge, but also introduce the thinking: at the time of the worldwide COVID-19 epidemic outbreak, why did China inject vitality into the world's economic recovery? Both companies like BYD and individuals are actively involved in the fight against the COVID-19 epidemic, while forming a case study of China's story to inspire students to take responsibility.

#### 4. Implementation Plan

From the above analysis, we know that professional English contains a wide range of contents and involves the cross-fertilization of various professional knowledge. Professional English requires a long period of continuous learning and requires follow-up training by teachers so that students can develop the habit of lifelong learning. This requires teachers to lead by example. In addition to teaching behaviors, there are many words and behaviors that do not seem to be directly related to the content of the classroom that can have a huge and far-reaching impact on students' growth. Based on this, a suitable platform should be adopted as a second classroom for teaching and learning, and a project-driven approach should be used to educate students in order to achieve good teaching results.

The college has built "Intelligent Special Vehicle Industry College", which is a project of "1331 Project" in Shanxi Province. Through the establishment of this modern industrial college, we deepen the integration of industry and education, and collaborate to educate people. The Industrial College transforms the domestic leading research results, and a large number of students are involved in each project during the transformation stage. At the present stage, we are actively promoting the projects of "intelligent bulk feed truck, fully hydraulic bulk feed truck, intelligent livestock and poultry transport truck, intelligent transport cage, intelligent feed processing system, and special mobile platform landing drone". The above projects are deeply integrated with teaching in terms of student research assistance, discipline competition and graduation design. In the research activities, students are exposed to various cutting-edge knowledge, many of which involve foreign advanced knowledge, and can use them to design projects, learn English knowledge, establish correct values, cultivate professionalism and practice craftsmanship while completing their research work.

In the field of education, a project refers to a series of learning activities in which students investigate, observe, research, express their new learning, present, and share around a chosen topic. Educational research refers to this type of learning activity as project-driven learning. The basic feature of project-driven learning is that it is student-centered and project-based. All teaching activities in project-driven teaching mode revolve around real projects, and when students complete the required projects, teachers will have completed the corresponding teaching contents. The project-driven model is mainly reflected in the establishment of many project-driven foreign language learning centers and the

empirical research on the effectiveness of project-driven teaching in foreign language learning environments, the roles of teachers and students, and the challenges they face.

**Table 1.** Project content

Project Name	Project Overview		Specialties involved
	Project Objectives		
		Master the basic professional vocabulary of electromechanics, develop professional English reading skills, and improve the quality and speed of reading professional English	
Project I Fully hydraulic feed truck	Content	Find and organize foreign language materials related to fully hydraulic feed trucks	Mechanical manufacturing and automation; Mechanical and Electronic Engineering; Intelligent Manufacturing Engineering
	Form	4-person project team	
	Results	Submit translation materials	
Project II Take-off and landing drones	Content	Find and organize foreign language materials related to take-off and landing drones	Mechanical and Electronic Engineering; Intelligent Manufacturing; Electronic Information Engineering Robotics Engineering
	Form	4-person project team	
	Results	Submit translation materials	
Project three intelligent transport vehicle	Content	Find and organize foreign language materials related to intelligent transport vehicles	Mechanical manufacturing and automation; Mechanical and Electronic Engineering; Intelligent Manufacturing; Electronic Information Engineering; Robotics Engineering
	Form	4-person project team	
	Results	English Academic Report	

English projects based on the project-driven teaching model are designed based on project-driven design principles. Teachers design teaching projects based on the teaching content, and students form project groups to understand the

project content. After that, each project group is required to complete three projects. Students choose the project theme, communicate and practice around the theme in small groups, and perform knowledge output to complete the whole learning process. Finally: Presentation of results. Students present their project results in groups. The teacher assesses each student based on their learning attitude, performance and results. The distribution of tasks is shown in Table 1.

Through the research, students were more agreeable to the content arrangement and the project content was more relevant. As a result of the project, they were able to move from passive to active communication. In addition to this, students felt that the program schedule was flexible and operational, and that the students created their own real-life language environment during the program implementation to practice their language application skills. For students who are planning to study in graduate school, they can read in English by reviewing materials and designing experimental programs. In addition, through the project exercise, students establish a scientific world view, environmental awareness, standardization, and awareness of regulations to improve the overall quality.

## 5. Conclusion

This paper analyzes the characteristics of Professional English for Mechanical and Electrical Courses and discusses the common problems of Professional English. On the basis of this, we propose to integrate the ideological and moral education into the professional English teaching based on the "immersion" teaching concept and the natural combination of the Civic and Political Science content and the professional English course. Later, on the platform of the Industrial College, we adopted a project-driven training model for practice. By educating students to establish correct values, it is important to improve the professional quality and craftsmanship of engineering students and show the characteristics and effectiveness of the school's education,

and also provide a basis for the construction of Civic Science.

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