Research on Special English Teaching and New Technology Development Based on New Energy Materials

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Abstract. As a national strategic emerging industry specialty, new energy materials and devices focus on the cultivation of university students' innovative ability and international competitiveness. Combining professional characteristics and major problems in professional English teaching, explore an open "international conference" teaching model to build a "student-oriented" classroom. Under the guidance of this model, professional English courses, with a focus on both the professional foundation and applied practice, are mainly project-driven learning, which stimulates students' ability to use professional English in many aspects.

1. Introduction
In recent years, the new energy industry has developed rapidly in China, which has greatly increased the demand for relevant talents at various levels, prompting many universities to set up new energy-related majors, with the aim of training outstanding innovative talents suitable for the development of the industry. As a green renewable energy source, its development and utilization have become the focus of attention of various countries. Since the release of the Medium- and Long-Term Development Plan for Renewable Energy in China in 2007 [1], the strategic characteristics of the new energy industry have become increasingly prominent. In response to this development situation, the Ministry of Education proposes to build this strategic emerging industry in universities. In 2010, the Ministry of Education approved 15 universities in the country to set up national strategic emerging industries in new energy materials and devices [2]. As this major is a global emerging strategic industry major, open and international talent training has become the primary issue for the implementation of new energy strategies. Professional English is an important tool for college students to grasp the international industry trends and absorb the latest scientific and technological information at home and abroad. The Ministry of Education has included it as a compulsory professional course in the undergraduate curriculum. Combined with the guiding idea of "serving the country and regional economic and social development", with the purpose of serving the talent training and scientific research of the regional new energy industry, a new energy materials specialty was established in the School of Materials Science and Engineering to cultivate a new era of All-round talent required by local and industry. With the rapid development of the world economy and the internationalization of knowledge, people from all walks of life need complex talents who have both solid professional knowledge and good international communication capabilities. In order to better adapt to the development trend of today's society, students of new energy materials should pay attention to the study of professional English. "English for New
Energy Materials" is a powerful tool for new energy materials students to understand the latest developments in the world's new energy materials industry and the latest progress in scientific research in related fields, learn to master the latest related technologies, and conduct international exchanges. However, the current teaching methods still follow the closed teaching mode, such as reading-translation by the teacher, students' hard vocabulary, and lagging teaching methods are difficult to cultivate university students' international competitiveness.

2. Analysis of the status quo of English teaching of new energy materials

2.1. Teaching objects and class schedule

At present, English courses for new energy materials and devices are available to third-year students of our university. Usually, the number of electives is about 60, which is a compulsory professional course. Except for students in a few small languages, the vast majority of students who have taken courses have accumulated English knowledge from junior high school, high school to college for nearly ten years. This course is an extension of Basic English in the field of new energy materials and devices. It has a total of 64 hours and is divided into two semesters, including 32 semesters in the spring semester and 32 semesters in the fall semester [3].

2.2. Teaching content and teaching methods

Based on the reference to relevant teaching materials, the teaching content of this course is shown in Table 1. The teaching emphasis is on the translation of long and difficult sentences and paragraphs in professional English, and the difficulty in teaching is the grasp of professional English vocabulary and oral expression.

| Semester   | Teaching time (hours) | Course Contents                                                  |
|------------|-----------------------|-----------------------------------------------------------------|
| Spring     | 4                     | Technical English Translation Skills: Grammar Structure          |
|            | 4                     | Technical English Translation Skills: Long Sentences and Passive Voice |
|            | 4                     | Chapter 1 Introduction to materials science and engineering Historical Development of Materials and Technology |
|            | 4                     | Chapter 2 Periodic Arrays of Atoms                                |
|            | 4                     | Chapter 3 Types of Bonds in Crystals                             |
|            | 4                     | Chapter 4 Defect Crystal Chemistry                               |
|            | 4                     | Chapter 5 Properties of Materials                                |
|            | 4                     | Chapter 6 Classification of Composite Materials                  |
|            | 4                     | Renewable Energy Commercialization I                             |
|            | 4                     | Renewable Energy Commercialization II                            |
|            | 4                     | Chapter 1 Solar Energy                                           |
|            | 4                     | Chapter 2 Solar Thermal                                          |
|            | 4                     | Chapter 3 Solar Chemical and Solar Vehicles                     |
|            | 4                     | Chapter 4 Energy Storage Methods                                 |
|            | 4                     | Chapter 5 Lithium ion battery                                   |
|            | 4                     | Chapter 6 Thermo battery                                         |

As the new energy material and device major is an undergraduate major newly approved by the Ministry of Education to meet the needs of the development of the new energy industry in 2010, and its professional English teaching currently does not have a unified published textbook, only some higher vocational colleges have published highly targeted Basic textbooks are mainly based on traditional materials science and engineering or inorganic non-metallic materials major English textbooks and oral teaching. There is a slight teaching reform model in this regard. In addition, undergraduate students in local colleges have a weak Basic English foundation and lack self-learning ability. At the same time,
Bilingual teaching teachers are also scarce. Therefore, it is extremely important to analyze the current state of English teaching of new energy materials and devices and explore a teaching reform model of new energy materials and devices that is suitable for local colleges and universities [4].

2.3. Students' contempt or resistance to professional English learning
Most students have contempt or resistance to professional English learning. For students with good English proficiency, especially those who have passed the CET-4 and CET-6 exams, I feel that professional English is simple and there is nothing to learn, which is reading and translation. For students who have a poor foundation in English, I feel that professional English is even more painful. After all, I have ended the study of Basic English, and I must learn professional English. Basic English is useless, professional English is even more useless, and professional English words are generally longer, more difficult to remember, and so on.

2.4. There are some problems with the teaching materials used
As there is currently no official textbook published by the Ministry of Education, and temporary self-made handouts are used, in the process of use, teachers and students find that the textbooks used in this course have the following problems: 1. The textbooks have many errors. Words are often misspelled in the text, and individual errors can even affect reading. 2. The textbook is rich in content and not targeted. The content of the textbook covers many aspects of material history, material properties, material categories, commercialization of new energy materials, new energy categories, new energy materials, etc. It seems comprehensive and is not targeted. It is better as an intensive reading textbook, but not suitable as an intensive reading textbook. 3. The difficulty of textbooks jumps. Some articles are relatively difficult to read, like high school English level; some articles are more difficult to read, beyond the reading level of ordinary undergraduates. 4. The grammar content is relatively small, and the so-called translation skills are emphasized too much. The textbooks are not test-oriented training materials, and should be pragmatic, without too much emphasis on translation techniques.

2.5. Lack of practical teaching
At present, the teaching of professional English for new energy materials and devices in our school is still based on the Basic English teaching method, which is limited to classroom teaching, teacher speaking, and student listening. The objective and practical new energy materials and device projects and key technology parts are invisible and intangible. Students can guess the specific content of professional vocabulary and the specific hydrology and production practice process of text only based on imagination. Although the school level and college level vigorously promote online teaching, and hope to increase the communication between teachers and students through online courses, as far as professional English is concerned, students rarely take the initiative to use online teaching resources, even at the request of teachers. Visit the relevant website.

3. English teaching practice of new energy materials and devices

3.1. Selection of teaching materials and teaching content
The purpose of teaching English for new energy materials and devices is to teach professional terminology so that students can read professional literature more proficiently, laying a solid foundation for undergraduate thesis (design) or engaging in new energy related professional research in the future. In 2014, the Chemical Industry Press published a new English textbook for new energy, edited by Zhang Suzhen and Liu Xiaoyan. This is a book that mainly introduces English for new energy materials in China. Its content mainly focuses on new energy photovoltaic systems, wind energy, and health. Material energy can be expanded, and each chapter consists of words, sentences, text, assignments, and reading. The author uses this book as the main line to expand the content of new energy development in recent years. The contents of the lecture mainly include: (1) Focusing on the first four chapters of the "New Energy Professional English" textbook, which are Part I Overview, Part II PV Systems, Part III
Implementation of PV Systems, Part IV Wind power. I chose to explain the content of these four chapters because the students have already learned relevant knowledge in the junior professional courses and are familiar with the Chinese terminology. It is easier to memorize some professional vocabulary and stimulate students' interest in professional English. (2) The latest articles published in TOP journals are used for explanation, such as: "Novel p-type and metallic dual-functional Cu-Al₂O₃ ultra-thin layer for the back electrode enabling high performance of thin film solar" published in Chem Comm Chemical Newsletter in 2016 cells. First explained the structure of this type of communication article, and then explained the content of this article paragraph by paragraph, so that students can feel the most successful commercial solar cells, namely cadmium telluride (CdTe) solar cells, from performance to process and also What areas need improvement. Published in 2017 by J. Am. Chem. Soc. "Fine-Tuned Photoactive and Interconnection Layers for Achieving over 13% Efficiency in a Fullerene-Free Tandem Organic Solar Cell" of the American Chemical Society. Through the explanation of this academic paper, students will learn how to achieve more than 13% efficiency by fine-tuning the photosensitive and interactive layers in fullerene-free tandem organic solar cells [5].

3.2. Application of teaching methods
Before the beginning of each section, the author will randomly call the students to read what they have learned in this lesson. While listening to the students, they will explain the rare words and write on the blackboard for students to remember. Then translate sentence by sentence, explain the sentence structure of professional English, and finally find out a certain section of the content of this lesson for listening exercises, first let students read the next section of dictation three times, and then the book Close, and the author reads again. The first pass is as slow as possible, the second pass is slightly faster, and the third pass is read at the normal communication rate. This method is to further improve the learning ability of students and help them listen to academic reports. In order to allow students to feel the scientific research work in the frontier fields of the subject, select 2-3 review articles on new energy materials and devices, and let 2-3 students use the spare time to turn the review articles into oral reports (requires the production of PPT). The lecture will be given towards the end of the semester. For those who have not made a report, everyone needs to ask questions in professional English about the content of the report. This teaching method has the following advantages: (1) the study of cutting-edge knowledge of new energy materials and devices and the cultivation of scientific and cultural literacy. (2) Cultivate students' reading ability on professional English. (3) Training students' ability to express in professional English. The shortcomings of this teaching method are: (1) Due to the limited class time, each student cannot be explained about the professional literature, and the coverage rate is not high. (2) Some students do not read the thesis carefully and cannot explain the specific content of the selected literature, so that they cannot achieve the desired teaching effect. As shown in Figure 2, it is a new English teaching mode.

Figure 1. English teaching mode for new energy materials.
3.3. Assessment

Assessment is a way to evaluate the overall situation of students studying this course and promote student learning. The assessment of the course "English for New Energy Materials and Devices" is divided into three parts: (1) Final score of the final exam (70%). The final exam questions are English-to-Chinese, Chinese-to-English, and English writing. The content involves what you learned in a professional course. English-to-Chinese translation is to investigate students' mastery of professional terminology, especially some basic concepts and basic theories, accounting for 50%; Chinese-English-to-English translation is to allow students to master the writing pattern and translation of academic thesis before doing undergraduate graduation design. Skills, accounting for 40%; the English writing part is for students to give valuable opinions and suggestions on this course, accounting for 10%. (2) Literature report and classroom questioning (20%). Two or three students make a designated literature review report. Other students ask questions about the content of the report. Based on the report, whether the student’s idea of the PPT is clear, the explanation is clear, and the answer is answered. On-site scoring in terms of whether the question is reasonable, etc.; whether the student did not make a report asking questions about the content of the explanation, whether using reasonable sentences to ask questions, and whether the performance of the question was actively performing on-site scoring. (3) Attendance (10%), a total of 16 lessons throughout the semester, the implementation of an irregular roll call system, such as 5 rolls throughout the semester, 1 point less than 1 point, 3 points less than two times, 5 points less than three times 8 points deducted four times and 10 points deducted five times. The results of each student taking this course are well-founded, and from their final results, they can grasp their degree of emphasis on the subject of English for new energy materials and devices and the specific conditions of their studies. See Figure 2 for details [6].

![Figure 2. Assessment methods for new energy specialty English.](image)

4. Innovative Research on Teaching Methods of Professional English

4.1. Teaching reform

The new energy material specialty is a multidisciplinary and emerging discipline that covers a wide range of knowledge. Therefore, first of all, the author makes full use of multimedia technology to vividly display the teaching content, so as to improve teaching efficiency. At the same time, it is combined with blackboard writing to summarize in time, which is convenient for students to understand and master. The meaning of professional English vocabulary is relatively single, usually the same type of words has the same root. Therefore, in the teaching process, in combination with the blackboard, sum up the words with the same root in time, such as "tri-" is a prefix related to the number three, so as to deepen the impression of students, while facilitating students to master. Secondly, in order to achieve good teaching results, multiple teaching methods are introduced. For the intensive reading part of the teaching content, the main content is the teacher's lecture. The teaching content is explained in detail. At the same time,
heuristic and discussion teaching methods are introduced to help students master the common professional English vocabulary and long and difficult sentences in the field of new energy materials. Analysis methods and translation skills, so that students have a certain professional English reading and translation skills. For the extensive reading part of the teaching content, students take the lead and focus on student discussions and planned self-study methods. At the same time, they are combined with teacher lectures. Teachers can expand professional vocabulary in time and summarize new knowledge points in order to further improve students' reading and Purpose of translating professional English materials. This teaching method achieves the teaching effect of students listening carefully and actively participating in class, and actively asking for advice after class, and has achieved the expected teaching effect. Finally, adjust the opening time of professional English courses, such as the fifth semester or the sixth semester of undergraduate teaching, so that it can be connected with the existence of Basic English and also learn some of the professional basic courses, so that it can be more Learn professional English effectively.

4.2. Developmental Learning Reform in Combination with International Conferences
Aiming at the characteristics of the new energy specialty and the current teaching status, the author explores and explores a personalized, open "international conference" classroom teaching model; updates traditional teaching concepts, and explores professional English reforms in teaching methods and teaching content to improve classroom teaching effects. Construct college students' autonomous learning and personalized training models. This approach has clear theoretical research value and exemplary role. Its research process and practical results can provide reference and reference for the reform of English courses for materials majors in domestic universities.

4.2.1. Project-driven learning. In the first lesson of the course, an "international conference" is proposed, and all students are required to participate in the seminar as a unit and be an important part of the course assessment. On the one hand, to improve students' learning enthusiasm and initiative, on the other hand, students are required to master the basic skills of science and technology English communication. It should be pointed out that the rationality of group division has a great impact on the effectiveness of the "International Conference" classroom. In the first class of students, students of different English levels were divided into different groups according to college English grades; in the second class of students, 10 students were used as group units, and students were grouped freely. By comparing the effects of the seminar, the author found that the free team of students in the conference report and poster exhibition can better reflect the personality of the students and team coordination, and stimulate students' innovation.

4.2.2. The model gives full play to students' advantages in all aspects and improves innovation. The "International Conference" participating group is led by the group leader, according to members' professional English expression ability, scientific and technological information search ability, English PPT report and poster production innovation and practical ability, division of labour to complete project selection, poster production and conference presentation. In addition, the conference chairperson, secretary group, and conference affairs group are all registered by students to reflect their ability in organization, management, and teamwork. The class teacher writes and publishes a guide to the conference, including notes, meeting content, schedule, and contact information. Clarify the grouping of each group, the content of the meeting report, the name of the poster exhibition, and the report scoring rules.

5. Summary
This article combines the special characteristics of new energy materials and devices with practical problems in professional English teaching, introduces the "international conference" model into classroom teaching, creates a personalized, open internationalized teaching environment and a warm classroom atmosphere, and strengthens students' language application. Practical training. Through the
equal emphasis on basic knowledge learning and applied practice, it is committed to developing students 'independent thinking and self-practice ability, building a "student-oriented" teaching classroom, stimulating students' learning interest and initiative, and opening similar professional courses and other materials for the country Institutions offering professional English teaching reform for reference.

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