

Cultivation and Improvement of English Scientific Research Paper Writing Ability of Undergraduates Majoring in Materials Science

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Abstract. It is usually not easy for most of Chinese undergraduates to write good scientific research papers in English. Taking the undergraduates of the department of materials science in China as an example, this article discusses how to improve their ability of writing English scientific research papers. After briefly introducing the effects from College English Test on the writing ability of scientific research papers, the article discusses how to improve a professional English course and encourage students, especially top talents, to publish English scientific research papers.

1. Introduction

Scientific paper writing is the embodiment of students' comprehensive quality. In order to meet the needs of internationalization, cultivate students' comprehensive scientific research ability, and lay a good foundation for improving students' publication of scientific research papers, scientific paper writing in English has become an inevitable trend. It requires students not only to be familiar with the professional knowledge and writing methods of scientific research papers, but also have a solid foundation of English language. The article discusses the influence of CET (College English Test) Bands 4 and 6 tests in China, the teaching of scientific paper writing, and the guidance provided for students according to the characteristics of scientific paper writing and students' learning characteristics. Combined with teaching practice, the article discusses the teaching and tutoring methods of professional English teaching to improve students' ability in writing their English scientific research papers.

2. The Effects from College English Test on the writing ability of scientific research papers

College English is supposed to be the basis for writing international scientific research papers, but due to the exam-oriented requirements, the learning content is far from the language foundation and writing guidance required by the writing of scientific research papers, and this vacancy can only be filled by professional English. However, due to the weak materials science knowledge of English teachers and their hardship of short-term improvement, there are also deficiencies in the professional English knowledge and skills of teachers in the materials science department, which makes ESP become a good transition during this period.

2.1 The Effect from College English Test (CET)

The CET Bands 4 and 6 tests have a history of more than 20 years in China and have objectively made great contributions to college English teaching in China. However, there are many problems arising from the industrialization of examinations. Many college students take passing CET Bands 4 and 6 tests as the ultimate goal of learning English. Many teachers are forced by various factors to meet the needs of students in English teaching. In a sense, the College English Teaching in the first and second years has actually become an exam-oriented education for the national CET Bands 4 and 6 tests. Graduate students in science and engineering cannot escape from English learning. Many graduate

students, after passing the postgraduate entrance English examination with painstaking efforts, begin to prepare for the English degree examination for being master or doctoral students or TOEFL test, IELTS test, GRE test and so on [1]. Those tests basically do not reflect the contents and thoughts of EAP/ESP (English for Academic Purpose / English for Specific Purposes) teaching, and affect the students' motivation of to transfer to EAP.

2.2 A good Transition in Active Exploration

2.2.1 Great difficulties English teachers met in transition to materials science majors teaching

For College English teachers themselves, they had accustomed to learning language knowledge and interesting cultural content and now turn to learn materials science professional knowledge with more rigorous logic and more boring content, which is of great span and difficulty. Therefore, at present, professional English courses are mainly taught by the teachers majoring in materials science. With the increasing internationalization of teaching and research in colleges and universities, the language competence of English teachers majoring in materials science has been significantly improved.

2.2.2 A good transition for special purpose English

The real purpose of ESP is to use language to achieve a definite goal. ESP teaching is not just about English teaching or professional knowledge, but about practical training so that students can learn how to communicate in English in their professional fields in a meaningful way. So, after learning and training of broad general English vocabulary and syntax knowledge, ESP teaching should try to reduce the interpretation of language knowledge. Teachers should strengthen students' comprehensive ability of positive vocabulary, training the application of basic syntax, and add a certain number of professional vocabulary. Teachers can help students create a good professional context, and set practice situation, organize students according to the situation to complete dialogue, discussion, topic speech, send and reply to various professional documents and other communication tasks, in order to practice English listening, speaking, reading, writing ability [2].

3. Teaching of English scientific paper writing for undergraduates majoring in materials science

3.1 Improvement of the comprehensive English ability of professional teachers

As a Chinese saying goes, "To make the desired iron, the tools used in the process must be hard enough, harder than iron." Teachers should constantly enrich themselves, strengthen their own professional ability, improve professional English teaching and be familiar with English word formation and related grammatical patterns. Familiar with the professional knowledge of materials science, timely learn the frontier trends of the discipline, and continue to research and explore teaching methods and rules. Teaching units should attach great importance to professional English teaching, conduct special training before teachers taking up the posts, and create conditions to improve the teaching level of professional English teachers as much as possible. If professional English teachers can be organized to engage in professional English teaching counseling and retraining and are encouraged to participate in high-level teaching seminars, further training, there will be more high-quality professional English teachers.

3.2 Enriching classroom activities to increase students' interests

When teaching professional English, students should be encouraged to participate and improve their learning enthusiasm and initiative. When mentioning some references, students had better to be arranged in groups to search for the latest professional references from the original English. Teachers should present students the arguments and results of references in advance. Meanwhile, teachers timely participate in the questions and discussions. Besides, teachers can choose the original video clips in the teaching process, which have both vivid pictures and English explanations. Students will be very willing to accept them. On the basis of the roughly understanding of most students, they are required to retell the contents shown in the video in English. Through similar exercises, students are

more interested in learning professional English and have an in-depth understanding of English words and sentence patterns in the field, which gets twice the result with half the effort.

3.3 Teaching students in accordance with their aptitude

Students who like independent learning and those who like to rely on the external environments have different needs for teachers' guidance. The former hopes teachers to assign the sources of data, the requirements of tasks and the matters needing to pay attention, then, they arrange the learning independently. The latter likes to be accompanied by teachers or classmates during the whole process. Learners with different aptitude have different kind of reliance on the learning environments. Dependent on external learning environments (such as learning materials, learning partners, etc.), are called field-dependent learners who regard learning communication as an important channel to acquire knowledge. For field-dependent learners, teaching design can guide them to learn effectively through communication. For independent learners, various incentive mechanisms should be introduced, and a perfect formative evaluation system should be established [3]. In short, teachers should consider the needs of different students and teach them in accordance with their aptitude.

3.4 The irreplaceable role of blackboard writing in teaching

As a traditional teaching medium, blackboard writing plays an important role that multimedia courseware cannot play. If multimedia courseware is used, many knowledge points can only stay in students' vision for a very short time due to the fast page turning speed, which is not helpful for students' overall grasp of what they have learned. On the one hand, teachers' blackboard writing contains the basic framework, key and difficult points of the class, which students can watch or record at any time. There should be some teaching contents on the blackboard when teachers writing, speaking and analyzing. Only then, students can better follow teachers.

3.5 Blackboard writing and multimedia teaching forming organic combination

If only one media is used in teaching, students receive a single stimulus, which is difficult to achieve the ideal effect. If multiple media are used to stimulate students' senses from various aspects, the effects will be significantly different great. Multimedia teaching is a combination of information, sounds, and pictures, saving time and improving classroom efficiency. In the teaching process of materials science professional English, teachers should make full use of many media-assisted teaching to improve the teaching effect, which can not only attract students' attention, but also deepen their understanding, so as to improve their enthusiasm.

Each kind of teaching media has its unique functions and advantages, but also has its limitations, which can be made up by other teaching media. Therefore, a variety of teaching media should be comprehensively used to improve teaching efficiency. The media may interfere with each other. Therefore, the all kinds of teaching media should be optimized and combined in order to make every kind of teaching media play a greater role.

3.6 Interdisciplinary learning and interest cultivation

Materials science has the characteristics of rich content, strong theory, practice, and interdisciplinary. Based on physical and chemical properties, materials can be divided into metal materials, inorganic non-metallic materials, organic polymer materials and composite materials [4]. During the teaching process, teachers actively guide students to participate in the frontier information capture, collect and read the graduation theses and journal articles which interest them, access to English resources as a key contents of English learning, and try to write English abstracts.

3.7 Top talents summarize scientific achievements and publish English research papers

Different from the teaching of English for General Purpose, professional English is neither a pure language course nor a pure professional course, but a course combining English language knowledge with specific professional knowledge. After the training of professional foreign language courses, students can not only read English literature related to their majors and obtain scientific and technological information, but also can comb, analyze and summarize the Chinese and English

references they read within the scope of their existing ability, or propose new ideas based on existing theories and experiments. For undergraduates, published scientific research papers are generally not required, but students are encouraged to have their research papers published. For the outstanding talents, teachers encourage them to publish academic research papers, better SCI papers, or even a high impact factor SCI papers in English.

4. Summary

English scientific paper writing involves a large amount of professional vocabulary, grammar and syntax knowledge points. It is not easy to write a good one for most of students. When students understand the characteristics of scientific paper writing, teachers can guide them to carry out a large number of writing exercises and get familiar with the expressions. Teachers can set up a corpus and give relevant vocabulary and expressions to students. Writing exercises for scientific research papers can range from small to large, from simple to complex. For example, students can be encouraged to describe and record in English the process and results of the experiment, then ask them to practice summarizing the purpose, method, results and conclusion of the experiment in about 260 English words. After the summary taking shape, students are encouraged to supplement explanations, add comments, describe documents, and finally form a prototype of an English scientific paper. In the course of writing in professional English, the revision and polishing of the theses can be of great help, from which students can form high-quality papers. In addition, effective accumulation of a large number of excellent writing practices lay a good foundation.

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