

# The Practice and Exploration of Full English Teaching in Higher Education Science and Technology Courses

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**Abstract.** In order to develop students' professional English application level and practical ability to engage in research, the Ministry of Education has mentioned and encouraged the promotion of bilingual teaching in Chinese and English in several documents. Most prominent colleges and universities in China, especially the comprehensive ones, have carried out bilingual teaching, and many colleges and universities have carried out English teaching, covering various disciplines. In particular, science and technology courses are greatly affected by the development of internationalization, so it is essential to explore and reform English teaching. These reforms are conducive to meeting the needs of the state and society and are also necessary for individual development. Based on the trend of globalization, this paper discusses the importance and necessity of English teaching of science and technology courses, analyzes the current situation and existing problems of English teaching, analyzes the influencing factors of teaching and learning, and explores and summarizes the teaching methods and teaching modes of entire English teaching of science and technology courses in combination with teaching practice.

**Key words:** higher education; Teaching in English; Science and technology courses.

## 1 Introduction

With the continuous development of communication and integration means such as the information industry, transportation, and shipping, the process of globalization is advancing in all walks of life, especially in science and technology industry and manufacturing industry, which is increasingly prominent: scientific and technological research and development collaboration, procurement and manufacturing globalization. Moreover, they support these societies [1].

What will be needed is the internationalization of education and the cultivation of composite talents with an international vision. As the highest stage of education, higher education shoulders the heavy responsibility of training senior talents and is the critical node and promotion stage of training international talents [2]. Entire English teaching is a meaningful way and measures to achieve the goal of double first-class development, especially for science and technology courses. English teaching is not only the form of English teaching, but more importantly, it is an indispensable part of international talent education to sort out international knowledge content, expand students' international vision, professionally train English communication and expression ability, cultivate international team cooperation ability, and enhance international innovation and practice ability [3].

Today's era is in the stage of rapid development of science and technology, culture, and other aspects; the knowledge taught by school teachers can only play a role in building the knowledge framework and consolidating the foundation, and it will soon be outdated with the rapid development of The Times [4]. Modern society needs lifelong learning and continuous learning. With the development of knowledge globalization, the more critical skill taught by all-English teaching is "fishing" so that students can continue to learn the latest knowledge after graduation and realize the creation of more excellent value [5].

## **2 The present situation and existing problems of all-English teaching**

At present, in the curriculum system of various colleges and universities, offering all-English courses is not the mainstream, and various problems need to be further studied and explored. First of all, the teaching staff is an important influencing factor. In recent years, with the continuous development of China's economy and the increase in the number of returnees [6], the English level of the teachers has made significant progress, especially the young teachers of science and engineering, who have been exposed to more English content in the postgraduate research stage before engaging in teaching, including reading English literature, writing English reports and papers, and communicating in English, etc [7]. These are an excellent foundation and guarantee for teaching in English. Therefore, teaching in English is mainly undertaken by young and middle-aged teachers. Of course, some English courses in colleges and universities are taught by foreign teachers. However, because foreign teachers need to learn more about the English level, oral expression, personality, and ideology of domestic students, it can easily lead to unsatisfactory teaching results [8]. In the foreseeable future, the main force of domestic college teachers is still local teachers. Therefore, it is essential to improve the ability of local teachers to teach in English. Colleges and universities are gradually paying attention to training and improving teachers' English teaching ability. For example, the relevant colleges of our university have held many English-taught competitions for young and middle-aged teachers and achieved good results.

Compared with teaching in Chinese, teaching English requires teachers to spend more energy and time. All-English teaching is not simply translating Chinese into English but reorganizing and perfecting the knowledge and teaching process according to the characteristics of Chinese students. Whether it is course preparation, production, modification of teaching courseware, or targeted interpretation of many foreign language professional vocabulary [9] and after-class question-answering, all need efforts from teachers. Therefore, it is necessary to tilt the calculation of the teaching workload to match the effort to promote the sustainable and benign development of all-English teaching.

As another aspect of "teaching and learning," students' condition must also be focused on, including psychology, knowledge, English level, etc. In recent years, parents from all walks of life have paid more and more attention to students' English education. Today's college students generally have English classes in primary school, and some even begin to learn English in kindergarten and have studied English for more than ten years before entering college. However, objectively speaking, the English communication ability of Chinese students still needs to be further improved, which is related to the absence of an English application environment for a long time. Some students read English smoothly while teaching English, but it is difficult to

express their views in fluent English, and they feel that "dumplings in the teapot can not be poured out." There are also some students whose English level is correct [10]. However, due to psychological factors coupled with unfamiliar professional vocabulary, they are always shy to express themselves, which is also a significant barrier to communication. In addition, due to the different levels of English education in primary and secondary schools, some students need help with English pronunciation. Teaching and learning is a process of communication, not one-way. Therefore, in teaching English, teachers and students need to keep the channels and loops open, and educators need to work hard to explore practical ways and methods, which is very different from Chinese teaching.

### **3 Practice and exploration of all-English teaching**

"Optoelectronics" is a compulsory course for our school's electronics and science and technology major. It has been taught in English since 2016 and is a typical course in science and technology. Taking this course as an example, the author discusses the characteristics of English teaching science and technology courses, analyzes possible problems, and explores solutions and ways to solve them, hoping to provide references for subsequent courses.

#### **(1) Select teaching materials and construct teaching content**

The first problem to be solved and paid attention to is the choice of teaching materials. Compared with Chinese teaching materials for science and engineering, English teaching materials have many classics. Especially for emerging disciplines with rapid development, English teaching materials are dominant in the number of authoritative classic teaching materials. However, the teaching materials should cover the teaching content of the syllabus, adapt to the existing knowledge base of Chinese students, and meet the requirements of the number of hours and depth of learning, which need to be carefully screened. Some textbooks have a Chinese translation, which is a double-edged sword. The Chinese translation will reduce students' enthusiasm for reading English textbooks. However, the author believes the Chinese translation can help students better identify and fill in the gaps. If teachers give proper guidance, students' enthusiasm for reading original English textbooks will remain high.

For different majors in different colleges and universities, due to the different emphasis of majors, English textbooks will miss, lack knowledge, or lack of depth of explanation of some contents. Therefore, teachers must supplement and improve the teaching content according to the college's professional characteristics and the students' basic situation. In addition, the order and knowledge structure of foreign textbooks may be inconsistent with domestic education, which requires teachers to re-organize and establish the entire knowledge system and establish a complete knowledge framework for students to avoid fragmented knowledge and difficulty in mastering the whole picture of knowledge, resulting in students unable to integrate.

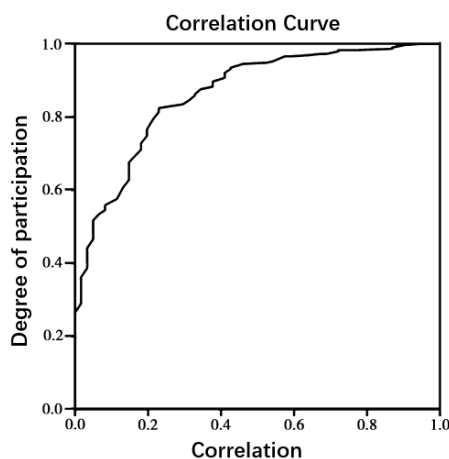
Another advantage of teaching in English is that you can keep up to date with cutting-edge information. Most of the most authoritative newspapers are English journals for science and engineering. Breakthroughs and the latest progress in the subject field are published in English journals, so whole English teaching can be close to the table and actively introduce the latest development of the subject into the classroom. Nowadays, journals have online versions, and students can even introduce and discuss the latest reports in the morning in class. Compared

with the knowledge in textbooks, students are more willing to accept these contents and have more interest. Because the new progress represents more possibilities in the future and changes in the future of work and life. In the case of optoelectronics, the discovery of a new effect or the successful construction of a new device often represents the upgrade of future communication or information processing means, which may have a leapfrog impact on production and life, and the prospect alone is exciting. For example, the realization of all-optical logic computing is expected to improve significantly the performance of existing computers, and the successful transmission of holograms can make people thousands of miles away as close to the experience is entirely different from existing forms of video conferencing. Practice shows that introducing these latest developments can significantly improve students' learning enthusiasm, thus driving their interest in learning the basic knowledge of the textbook. However, it also helps students to track the latest developments and improve English reading and communication skills, which can be said to be three birds with one stone.

## (2) Teaching methods

One of the critical points of all-English teaching that needs special attention is the feedback from students to teachers. Traditional Chinese teaching can achieve this by answering questions in class. However, more is needed for all English teachers to answer questions alone. Even with written links such as homework, teachers still need help to grasp the degree of students' actual acceptance of knowledge. When teachers find that students answer questions in the actual class, due to the lack of language, they often choose the simplest way to answer and are not inclined to elaborate. Suppose there are several ways of electronic transition between two energy levels. In that case, students usually only answer the three transition forms in the form of English words mechanically, and few students discuss them. Therefore, teachers need to improve their teaching methods. Through teaching practice, teachers can find the topics that students like, especially those that will generate different opinions and lead students to discuss and learn while discussing. In this way, students will have high participation and enthusiasm. Even if the English expression of some sentences is complicated, students will rack their brains to think and explain by looking up dictionaries, translating online, and consulting others. For example, in discussing the phenomenon of tunneling

Regarding tunneling routes, students were enthusiastic and naturally divided into different opinion groups for debate. I learned the current knowledge and reviewed and consolidated the previous knowledge of quantum mechanics. Teachers can consciously collect and propose topics suitable for discussion, which can be discussed in class or as research assignments. Students can search literature, collect information by themselves, and write an English report for discussion in class. Teaching in English is different from teaching in Chinese.



**Figure 1.** The correlation characteristic curve of this experiment.

As the findings of the first questionnaire showed that the problems of backward Psychology Class teaching modes and single Psychology Class teaching textbooks were particularly prominent, the students in this class were investigated again after the introduction of digital education technology. There was no invalid questionnaire with many missing questions. Therefore, 55 valid questionnaires were finally entered into the statistics. The 55 people scored the improvement degree of the problem, with a total score of 10 points, and the average score was taken finally. The questionnaire findings are shown in Figure 1 (Multiple choices were allowed).

#### 4 Conclusion

Given the current social development and the characteristics of science and engineering subjects, exploring and implementing English teaching is essential. However, in the teaching process, teachers must pay attention to the differences between teaching and learning and Chinese teaching and actively explore and practice various teaching methods and methods. The hard work of teachers will be different after graduation for many years. The feedback that the study of optoelectronics has benefited me greatly which is incredibly beneficial to work and further study. Some students go abroad to study and often send messages to ask questions. Some students expressed their fondness for the optoelectronics teachers' English courses in school assessment, which is the most incredible comfort and encouragement for teachers, and the students' recognition of all-English teaching.

**Acknowledgement.** This paper was supported by young scholars of technologies and innovations project of Long Dong University in 2021(901110040313)

This paper was supported by key research project of the foreign languages teachers development in universities of Gansu in 2022 (Z202204)

This paper was supported by doctoral found project of Long Dong university in 2022(901110050413)

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