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On the Path of College English Teaching Reform in New Engineering Disciplines from the Perspective of ESP

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Abstract: With the advancement of new engineering disciplines construction, traditional college English teaching is facing new challenges and opportunities. As an important part of higher education, college English needs to keep pace with the times and serve the vast talent cultivation needs of the new engineering disciplines. The question of how to make college English teaching more effective is one that warrants further exploration. ESP (English for specific purposes) emphasizes conducting English teaching tailored to specific professional or occupational needs, providing an effective perspective for the reform of college English teaching. This paper explores the reform path of college English teaching from the perspective of ESP in the context of new engineering disciplines. It covers changes in areas such as course objectives, teaching content, teaching methods, faculty development and the implementation support for these reforms, aiming to enhance students' ability to use English for professional communication and learning in the new engineering fields, and to cultivate interdisciplinary talents that meet the demands of the new era.

Keywords: English for Specific Purposes; New Engineering Disciplines; ESP; College English; Teaching Reform

1. Introduction

In the new era, where the fourth technological revolution centered on information technology is accelerating, higher education is facing new challenges and opportunities. The new context and challenges place high demands on the construction of higher education institutions and talent cultivation. In response to the new round of scientific and technological revolution and industrial transformation and aiming to accelerate the cultivation of high-level interdisciplinary talents urgently needed in emerging fields, and enhance the overall level of China's higher education as well as its ability to serve economic and social development, the Ministry of Education of China has been promoting the construction of the "Four New" fields, namely new engineering, new medical, new agricultural, and new liberal arts disciplines since 2017. This has ushered Chinese foreign language education into a new period of development, bringing unprecedented pressure and challenges to college English teaching reform. Under such circumstance, how college English teaching can be made even more effective is a question well worth discussing.

Within the Chinese higher education system, engineering education holds a crucial position. According to Wu, engineering education accounts for one-third of all undergraduate education programs, one-third of enrolled students, and one-third of graduates, with more than one-third of the world's total graduates in this field. Over 90% of higher education institutions offer engineering programs [1]. New engineering emphasizes interdisciplinary integration, innovative practical abilities, and an international perspective. As an important part of higher education, college English needs to keep pace with the times and serve the vast talent cultivation needs of the new engineering disciplines. English for specific purposes emphasizes conducting English teaching tailored to specific professional or occupational needs, providing an effective perspective for the reform of college English teaching in the new engineering context.

2. The Necessity of College English Teaching Reform in New Engineering Disciplines from the Perspective of ESP

2.1 The Demand for Cultivating New Engineering Talents

The primary function of higher education

institutions is to cultivate talent. Through systematic curriculum design, practical teaching, and research training, universities equip students with a comprehensive knowledge base and essential skills. This ensures that upon graduation, students are well-prepared to meet the needs of society and become the professionals that the community and nation require for their ongoing development.

The rapid development of new engineering disciplines aims to cultivate innovative engineering and technical talents that can adapt to the needs of the global technological revolution and industrial transformation. New engineering majors involve emerging technology fields such as artificial intelligence, big data, and intelligent manufacturing, areas where international communication and collaboration are frequent.

To succeed in these dynamic and globally interconnected environments, graduates of new engineering disciplines must not only have a strong foundation in their respective fields, but also possess the ability to use English effectively in professional settings. This includes acquiring information, exchanging ideas, and participating in international collaborations. Such language skills are critical for navigating scenarios like international academic exchanges, multinational research projects, and global corporate partnerships.

English is an important tool for global scientific and technological as well as academic exchanges. Proficiency in English allows students to access a wealth of global resources, engage in international dialogues, and stay competitive in a rapidly evolving job market. Therefore, integrating even more effective English teaching into the curriculum of new engineering disciplines is indispensable for preparing students to thrive in an increasingly interconnected world. By fostering these competencies, universities can ensure that their graduates are not only technically proficient but also equipped to contribute to global innovation and international collaboration.

2.2 Characteristics of English for New Engineering Disciplines and the Application Trends

New engineering disciplines emphasize interdisciplinary integration, covering numerous emerging and cross-disciplinary fields such as artificial intelligence and biomedicine, the Internet of Things and energy, among others. The English vocabulary and expressions in these areas blend specialized terms from various disciplines. Additionally, focusing closely on the practical needs of each new engineering discipline, the English used in this context is highly practical and targeted, with a focus on developing students' ability to use English to solve problems in engineering practice, technological research and development, international communication, and other scenarios.

Moreover, New Engineering English requires high standards of linguistic normativity and accuracy. For example, when writing engineering technical reports or academic papers, there are strict language norms regarding the description of data, expression of formulas, and explanation of charts and diagrams. As economic globalization advances and international communication and cooperation become increasingly frequent, there is a growing demand for talents proficient in industry-specific English. The internationalization process in new engineering-related industries is accelerating, which increases the demand for English proficiency in these industries. For example, reading latest international research papers, participating in international academic conferences, and collaborating with foreign teams on projects all require specialized English.

At the same time, international engineering certifications and industry standards are raising the requirements for English in new engineering fields. Traditional college English teaching has primarily focused on general English proficiency, often neglecting the specific English language skills needed by new engineering students for professional learning, research communication, and international collaboration. This gap makes it difficult to meet the demand for professional English knowledge and skills among students in new engineering disciplines. Therefore, it is time for college English teaching to undergo the necessary reforms.

2.3 The Development Needs of the Course

College English, as a fundamental public course with a large student base, covering

many disciplines including engineering, plays a crucial role in the higher education system in China. The college English curriculum is not only an important pathway for developing students' language abilities, but also a key course for cultivating their international vision, communication skills, and practical application abilities.

In today's competitive, globalized world, possessing strong foreign language skills has become one of the key criteria for evaluating high-quality talent. The quality of college English teaching is not only reflected in students' English proficiency, but also in their overall personal qualities and competitiveness, which, to some extent, also reflects the quality of talent cultivation. The college English course is not only a crucial foundation for students' personal growth and career development but also a key factor in the national education strategy and international competitiveness. The Work Focus of the Higher Education Department of the Ministry of Education in 2020 clearly stated the goal to "continue to deepen the reform of public foreign language teaching." Therefore, in response to the development and changes of the times, it is the responsibility of every college English teacher to continuously explore and deepen the reform of college English teaching. How college English can help cultivate high-quality, interdisciplinary professionals to meet the needs of new engineering disciplines is an issue that must be given high attention in the reform of college English teaching.

The curriculum serves as the link between schools and society, as well as between students and schools [2]. As traditional college English courses can no longer meet the diversified demands for talent in society, the country, and the market, college English must align with the requirements of the "Four New" initiatives, break down disciplinary barriers, and effectively integrate with professional disciplines to achieve interdisciplinary integration. The 2020 version of the College English Teaching Guidelines emphasizes that college English should cultivate students' ability to use English in practical applications. English for Specific Purposes reflects the instrumental role of college English, enabling students to acquire relevant communication skills for their future academic or professional fields through learning academic or vocational English related to their major or discipline.

ESP is aligned with the new era's requirements for college English teaching, aiming to enable students to use English appropriately and effectively in their studies, daily life, and future careers, meeting the needs of the country, society, schools, and individual development. Hutchinson and Waters believe that needs analysis is the most distinctive feature of ESP course design. Since awareness of needs is crucial in ESP [3], Cai argues that the future of college English lies in turning to ESP [4].

3. The Path of College English Teaching Reform in New Engineering Disciplines

3.1 Reconstruction of Curriculum Objectives

Cai proposes that public English courses should be designed to support students' professional learning and research, with the aim of improving their ability to acquire and communicate professional information in English within their fields [5]. From this perspective, college English courses in the context of the new engineering disciplines should not be limited to language skill development alone but should shift toward cultivating a comprehensive ability that integrates language and professional knowledge. The goal is not only to enhance students' basic language skills, such as listening, speaking, reading, writing, and translation, but also to closely align the curriculum with the future professional scenarios and academic needs of students in new engineering fields. The emphasis should be on cultivating their ability to use English for academic communication, writing technical reports, collaborating on projects, and other tasks specific to their field.

In this regard, the curriculum should include different phase-specific objectives. For example, in the first year, the focus should be on consolidating general English fundamentals and introducing English for new engineering disciplines. In the second year, students would gradually delve into professional English courses. By the third year, the focus should shift towards enhancing practical professional English skills, such as participating in English communication during internships or in

simulated international projects. By the fourth year, students should be capable of independently using English for writing and defending their graduation projects or theses.

Taking students majoring in automotive engineering as an example, the teaching objectives in the foundational stage should focus on helping students master basic general English knowledge and skills, such as basic grammar, common vocabulary, and fundamental listening, speaking, reading, and writing abilities. At the same time, students should be introduced to basic professional vocabulary in the automotive field, such as "piston", "engine", "transmission", and "chassis", etc., enabling them to read simple automotive documents in English. In the advanced phase, the teaching focus should shift toward the in-depth development of professional English abilities. The objective is for students to be able to read cutting-edge academic papers in the automotive field, write professional technical reports, and participate in discussions at international automotive technology conferences. For instance, students should be able to accurately understand and explain the innovations in new energy vehicle technology and the working principles of automotive intelligent driving systems in English.

With this curriculum framework, the English course will not only enhance students' language skills but also strengthen their professional competence, making them more competitive in future internationalized professional environments.

3.2 Updating Teaching Content

Teaching content serves as the vehicle for achieving teaching objectives and must align with those objectives. Wen argues that "course content should be continually updated, keeping pace with societal and technological developments, so that the knowledge acquired can serve both the present and the future" [6]. Hu believes that the content of courses related to ESP in new engineering disciplines should focus on enhancing students' ability to communicate effectively on complex engineering problems with industry professionals and the general public. The course content should integrate four key elements: the communication target, the content of communication, the communication methods, and the communication channels [7]. Carver argues that authentic materials are an intrinsic feature of ESP courses. Liao and Cai identified three guiding principles for ESP materials: meeting learners' specific needs, emphasizing skills and genre knowledge, and ensuring the authenticity of exercises [8].

Today, new engineering disciplines emphasize interdisciplinary integration and a diverse knowledge system, with cutting-edge, intelligent, and innovative technologies becoming representative keywords. Universities with sufficient resources can prioritize developing specialized textbooks for new engineering disciplines, while others can select textbooks that suit their specific institutional characteristics. Whether developing new textbooks or choosing existing ones, the content must not only cover the core knowledge areas of new engineering disciplines but also incorporate elements of cross-cultural communication. For example, introducing the cultural backgrounds, thinking styles, and collaborative practices of different countries in the field of new engineering can help enhance students' cross-cultural communication abilities and prepare them to address the complex challenges they may face in international engineering practices in the future.

Materials for ESP are "a source of language; a learning support; for motivation and stimulation; and for reference" [9]. With the development of information technology, teaching no longer relies solely on one or two textbooks, and the variety of available content has greatly increased. Teachers can conveniently use various teaching platforms, video-sharing sites, and English learning websites to find suitable teaching resources to enrich their curriculum. Since new engineering disciplines are closely tied to the cutting edge of technological advancements, it is essential to supplement textbook content with online learning resources. Teachers can gather and organize related course materials from international online platforms such as Coursera and EdX, recommending them for students' independent learning to broaden their global perspective. They can also provide students with specialized English vocabulary databases, grammar explanations, writing templates, speaking practice materials, and news related to the industry via dedicated English learning

websites or platforms, enabling students to study anytime and anywhere.

3.3 Innovation in Teaching Methods

Teaching organization is a means to achieve teaching goals. With the continuous development of educational concepts and technological advancements, there is an increasing emphasis on interaction and communication between teachers and students, as well as among students themselves. The traditional one-way lecture-based teaching methods can no longer meet the diversified demands for talent in today's students and society. Wen points out that teaching methods and techniques should not only make full use of the advantages of modern technology but should also promote the organic integration of students' knowledge, skills, and competencies through face-to-face communication [6]. Therefore, innovation in teaching methods is particularly important, as it not only affects students' learning outcomes but also directly influences teaching quality and classroom atmosphere. Currently, teaching methods like blended learning, flipped classrooms, project-based learning, situational teaching, and production-oriented approaches are gaining popularity among English teachers. These methods each have their own strengths, but their common feature is an emphasis on active student participation and interaction, while teachers make use of technological tools and real-world projects to enhance the practicality and effectiveness of learning. Among these, project-based learning is a teaching method that promotes student learning by completing real-world projects, and it has been widely applied in the context of new engineering education. Hu points out that the cultivation of new engineering talents places high importance on project-based learning model reforms, marking a shift in engineering education from a "content-centered" approach to a "learning-centered" one [7]. Hutchinson and Waters argue that ESP is a learning-centered approach [3].

In the context of new engineering education, teachers can use project-based learning methods to design English-language tasks such as market research reports on electric vehicles or English design plans for smart campuses. These tasks require students to use English to collect information, engage in team discussions, and present results in group collaborations. This interdisciplinary project-based learning model effectively combines language learning with professional knowledge, enhancing students' comprehensive application abilities. Beckett & Slater argue that project-based foreign language teaching is an effective method for integrating language and content to improve learning outcomes [10]. Teachers can also employ situational teaching methods to design work-related scenarios relevant to new engineering disciplines, such as simulating international engineering bidding meetings or technical research and development seminars, allowing students to communicate and interact in English in realistic settings. This helps students familiarize themselves with the use of professional English in real-world work environments, enhancing both their proficiency in professional English and their adaptability to future careers. These approaches provide new insights for English teaching in new engineering disciplines.

In conclusion, teaching method innovation plays a crucial role in adapting to the changing educational landscape and better preparing students for the demands of a globalized, technology-driven world. Through the integration of project-based and situational teaching approaches, students in new engineering fields can enhance their language abilities and professional competencies, ensuring that they are ready to face future challenges in their careers.

3.4 The Development of the ESP Faculty Team

Dudley-Evans & John believe that qualified ESP teachers should take on multiple roles, including that of an English teacher, curriculum designer, subject teacher and student collaborator, researcher, and evaluator of teaching and testing [9]. The development of the ESP teaching workforce has always been a hot topic of discussion in academic circles. Currently, ESP teachers are mainly composed of college English teachers and a small number of subject-specific teachers. Dudley-Evans & John outline three models of collaboration between language teachers and subject teachers [9], indicating that collaborative interdisciplinary team teaching is widely recognized as one solution to the problem of teacher qualification. In practice, some

domestic universities have already implemented this approach. For example, in the fall semesters of 2021 and 2022, Fudan University piloted a comprehensive academic English course for second-year medical students. The course was co-taught by college English teachers and medical faculty members. The medical teachers, who were from the School of Basic Medicine, all had overseas study or work experience and had mostly taught medical courses in English. The college English teachers were either experienced in teaching medical English or involved in teaching academic English course for medical students [11]. This collaborative interdisciplinary team teaching effectively integrated English language teaching with specialized knowledge, providing valuable insights and experiences for ESP teaching in new engineering disciplines.

For college English for new engineering education, an attempt can be made to establish interdisciplinary teaching teams consisting of college English teachers, new engineering discipline faculty, and industry English experts for collaborative teaching. The college English teachers would be responsible for language instruction, the new engineering discipline teachers would provide professional knowledge support, and the industry experts would share practical insights from the field. Together, they would design the curriculum, write textbooks, and carry out teaching activities.

On the other hand, it is undoubtedly crucial for teachers to undergo professional training. Universities should consider sending English teachers to participate in professional training courses or seminars on new engineering disciplines so that they can better understand the basic concepts, development trends, and specialized knowledge of new engineering fields, allowing them to integrate English teaching with the content of new engineering courses more effectively. At the same time, it is necessary to encourage teachers to attend specialized English teaching training, where they can learn advanced ESP teaching concepts, methods, and techniques to improve their teaching quality.

In summary, the development of the ESP faculty team is not only key to improving the quality of new engineering English teaching but also an important guarantee for promoting educational innovation and enhancing students' comprehensive qualities. Through interdisciplinary collaborative teaching and continuous professional development for teachers, the content and methods of teaching can be continually updated, thereby enhancing students' competitiveness in both academic and professional development.

4. Implementation Guarantees of Teaching Reform

The cultivation of high-quality, interdisciplinary professionals needed for the development of new engineering disciplines cannot be achieved without the support of college English education. To ensure the successful implementation of teaching reform, the first essential factor is the policy support from higher education institutions. University administrators should encourage the reform of college English teaching, providing support in areas such as curriculum design, distribution of teaching resources, and teacher evaluation. For example, the teacher evaluation system should include assessment indicators for ESP teaching reform outcomes, motivating instructors to actively engage in the reform process.

Secondly, the teaching management system should be optimized, establishing a flexible course management mechanism that allows students to choose English courses at different levels and types based on their professional needs and English proficiency. At the same time, the monitoring of teaching quality should be strengthened. Regular evaluations of ESP teaching reform outcomes should be conducted through methods such as student performance analysis, surveys, and teachers' reflective practices, with feedback collected to make timely adjustments to teaching strategies and methods.

Furthermore, teaching facilities should be improved, including the construction of intelligent language laboratories and practical teaching bases for professional English in new engineering fields. This will provide students with a favorable English learning environment and technical support. Collaboration with enterprises is also essential to provide internship and practical opportunities for students, allowing them to develop their language skills in real-world work set settings.

In conclusion, ensuring the successful implementation of teaching reforms requires

efforts from multiple levels, including policy support, teaching management, and facility construction. Only through comprehensive reform support can the new engineering English teaching reform be effectively advanced and provide students with higher-quality English education, thereby meeting the societal demand for interdisciplinary, highly skilled professionals.

5. Conclusion

The reform of college English teaching in new engineering disciplines from the perspective of ESP is an inevitable choice to align with the development of the times. The reform can be carried out in terms of the reconstruction of course objectives, updating of teaching content, innovation in teaching methods, and the development of qualified ESP faculty team. At the same time, the successful implementation of teaching reform requires the joint action of factors such as policy support, optimization of teaching management, and improvement of teaching facilities. Such reforms in college English teaching will enhance its alignment with the cultivation of talents for new engineering fields, laying a solid foundation for nurturing interdisciplinary professionals with international competitiveness. Furthermore, it will facilitate students' international communication and professional development in their respective fields, thereby advancing the synergistic development of new engineering construction and the internationalization of higher education.

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