Development of College English Textbooks against the Background of Emerging Engineering Education

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Abstract: To meet the dual requirements of Emerging Engineering Education and moral education, College English teaching needs to balance multiple objectives, including the development of students' professional English application skills, humanistic qualities, and value cultivation. Based on an analysis of the limitations of existing EGP and ESP textbooks, this paper highlights issues in current ESP textbooks for science and engineering, such as insufficient interdisciplinary integration, a lack of humanistic elements, and failure to include local perspectives. In response to these problems, the paper proposes three principles for developing College English textbooks: interdisciplinary integration, equal emphasis on humanistic and professional literacy, and a combination of local and international perspectives. It further elaborates on the pathways for developing College English textbooks tailored to Emerging Engineering Education from three aspects: classification of units, strategies for text selection, and design of exercises. The findings carry theoretical and practical implications for transforming College English textbooks from mere language skill training media into comprehensive educational tools that integrate language, professional knowledge, humanistic elements, and moral education.

Keywords: Emerging Engineering Education; College English textbooks; interdisciplinary integration; moral education

1. Introduction

The development of Emerging Engineering Education places new demands on College English courses, emphasizing the cultivation of core competencies and abilities such as a global perspective, cross-cultural communication, professional English application, innovative thinking, and global competitiveness.

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As the primary carrier of course content, textbooks play a crucial role in enhancing teaching quality and achieving educational goals. EGP textbooks, which focus primarily on general language skill training, fail to meet the practical requirements of Emerging Engineering Education and are inadequate in addressing the new English learning needs of engineering students. On the other hand, ESP textbooks, which concentrate on specific disciplinary fields, emphasize the integration of professional knowledge and the application of English in specialized domains but pay insufficient attention to humanistic aspects such as a global vision, language literacy, and engineering ethics. Therefore, in the context of Emerging Engineering Education and moral education, it is necessary to rethink the development of College English textbooks so as to meet the new demands of engineering education.

2. Research Background

2.1 The demand for appropriate textbooks to support College English teaching reform

Practical propositions such as the "Belt and Road Initiative," "cultural confidence," and "a community with a shared future for mankind" have set objectives for Emerging Engineering Education to cultivate engineering talent who possesses both instrumental rationality and value rationality (Xiang Cong, 2017). As a pivotal component in the ecosystem of engineering education, College English courses bear the mission of reconstructing humanistic values and enhancing soft power such as language competence among engineering talent. However, in the vast majority of Chinese universities, College English instruction remains dominated by EGP teaching which is driven by standardized English proficiency testing, overlooking the professional attributes of College English instruction (Cai Jigang, 2021). This approach falls short of meeting the practical needs of cultivating technical talent (Bai Lan, 2019). In the context of Emerging Engineering Education, it is imperative to reform College English teaching and conduct research on the development of supporting textbooks to cultivate engineering talent who integrate both instrumental rationality and value rationality.

2.2 Learners' needs analysis

To find whether students were satisfied with their College English learning, the author once conducted a questionnaire survey among her College English classes and collected 87 valid responses. Among them, 10.35% of students believed that the College English course failed to meet their professional development needs; 17.24% thought that after completing the course, they could not use English to explain the basic facts in their professional field; and 20.69% believed that they could not tell technological innovation stories of their field in English. Analysis of the survey results reveals that the vast majority of students expect the College English curriculum to provide sufficient language support or services for their professional learning and development. As the main carrier of teaching content, textbooks play an important function in disseminating new knowledge, ideas, and perspectives, and serve as the concrete embodiment of educational philosophies and objectives (Hu Jiehui & Li Jingnan, 2025). Therefore, researching and developing textbooks that align with the reform of College English teaching is an imperative task in serving the cultivation of engineering talent.

3. Current Status of College English Textbooks Development

In China's domestic textbook market, College English textbooks are broadly divided into EGP textbooks and ESP textbooks. EGP textbooks focus on language knowledge, skill training, and cross-cultural knowledge, without involving engineering expertise. ESP textbooks, on the other hand, are oriented toward specific fields of English use, such as academia, humanities, social sciences, arts, science, and engineering, aiming to enhance students' academic and professional literacy. Textbooks closely related to the cultivation of engineering talent are science and engineering ESP textbooks, i.e., English textbooks compiled for specific science or engineering disciplines. These textbooks are mostly compiled by comprehensive universities or industry-specific technological institutions in China, with a small number being introduced from abroad. The distinctive feature of such textbooks lies in organizing teaching content according to the mainline of a relevant discipline and integrating disciplinary content with English learning to help students effectively output and apply disciplinary knowledge in an English context.

Deng Shiping (2023) selected three sets of science and engineering ESP textbooks published after 2017 for comparative analysis. These three sets of textbooks "were all published by well-known domestic publishers, widely used, typical and representative, basically reflecting the current status of science and engineering ESP textbook development in China" (Deng Shiping, 2023). The study found that there are three major problems in the existing ESP textbooks as follows.

First, the depth of interdisciplinary integration is insufficient. That is, language is merely treated as a tool for carrying disciplinary content; the literary and cultural knowledge inherent in the foreign language discipline is not reflected in the textbooks. In addition, since the textbook content revolves around a specific discipline, the textbooks fail to achieve interdisciplinary integration.

Second, the textbook content is dominated by science and engineering knowledge, with relatively insufficient humanistic knowledge, which makes it difficult to achieve simultaneous enhancement of professional literacy and humanistic accomplishment.

Third, there is a relative lack of a local perspective. The presentation of Chinese elements in textbooks is inadequate. The existing ESP textbooks seldom reflect China's current development path and construction achievements, failing to fully leverage the value-guiding and character-shaping role of foreign language textbooks.

4. Principles for Developing College English Textbooks for Emerging Engineering Education

In response to the above three major problems, the development of College English textbooks for Emerging Engineering Education should adhere to three principles: interdisciplinary integration, combining professional education with humanistic literacy cultivation, and integrating local awareness with an international perspective. These principles are aimed at achieving the goal of Emerging Engineering Education: simultaneously enhancing engineering talent's humanistic literacy, language competitiveness, and professional competence (Yang Cheng & Fiona Henderson, 2020).

4.1 Basing textbook content on core engineering knowledge to promote the integration of language, culture, and disciplinary content

Textbook content can be designed on the basis of the common discourse features and core knowledge of broad engineering disciplines. Each unit involves a specific engineering field, yet all revolve around fundamental common core knowledge. Thus, the units are both independent and interconnected, forming an interdisciplinary knowledge network. The universality and relevance of the common core knowledge enable most first-year engineering students to embark on English learning that integrates "engineering + English" interdisciplinary approaches during their first year of study, laying the foundation for future transition to ESP or professional English learning. Meanwhile, the selection of texts and the design of exercises should incorporate knowledge from foreign language disciplines such as literature, culture, and international & regional studies, aiming to achieve the integration of language, culture and multidisciplinary knowledge in science and engineering.

4.2 Integrating humanistic knowledge according to disciplinary themes to increase the textbook's cultural and intellectual depth

Textbooks should, according to the themes of disciplinary knowledge, explore the humanistic dimension embedded in the history of disciplinary development or the disciplinary knowledge contained in the history of human development. Examples include the awakening of environmental awareness in the process of human utilization of the environment, and the close relationship between material application and human needs. By incorporating such content that is both informative and rich in inspiration and educational value, students can not only acquire engineering knowledge but also appreciate the profound humanistic connotations within it, achieving an organic integration of professional competence and humanistic literacy.

4.3 Incorporating Chinese elements and achievements to highlight the value guidance of textbooks

While introducing cutting-edge foreign technologies and cultivating students' international perspectives, textbooks should also emphasize the reflection of traditional Chinese scientific and technological culture as well as the latest achievements in modern technological development. This provides the linguistic and critical thinking input for enhancing students' ability to communicate the rationale and values behind China's development in relevant professional fields, and therefore better explain China's role in global engineering.

For example, in the unit that deals with energy engineering, the text can showcase the latest developments in China's new energy construction and its significant contribution to the global goal of tripling renewable energy capacity by 2030; in the electrical engineering unit, we can tell the story of China's world-leading ultra-high voltage super grid; in the civil engineering unit, we can display the wisdom and charm of mortise and tenon structures in traditional Chinese architecture; and in the aerospace engineering unit, it is recommended to introduce the contribution of China's successful commercial flight of the C919 large passenger aircraft to the global aviation industry. The integration of stories from traditional Chinese technology and contemporary development allows students to

gradually build cultural confidence and faith in the Chinese development path, thereby achieving the educational goals of moral education.

5. Pathways to Develop College English Textbooks for Emerging Engineering Education

5.1 Dividing units in accordance with key engineering disciplines

College English textbooks for Emerging Engineering Education can be closely aligned with major innovative and frontier areas outlined in China's national "14th Five-Year Plan," with the units divided in accordance with the key disciplines or specialties of renowned domestic and international science and engineering universities, such as Mechanical Engineering, Environmental Engineering, Energy Engineering, Safety Engineering, Chemical Engineering, Biological Engineering, Materials Engineering, Electrical Engineering, Computer Engineering, Aerospace Engineering, and Civil Engineering. Units should be designed in line with the principles of language teaching and learning. The selection of materials should be grounded in the common core knowledge of broad engineering disciplines. Each unit functions independently, focusing on a specific engineering field, but also interconnects and complements each other to collectively form a comprehensive and systematic knowledge structure of engineering English.

5.2 Focusing on authentic language and correct values when selecting English texts

Each unit may include two reading passages: Passage A and Passage B. Passage A provides a general introduction to the professional field covered in the unit, while Passage B focuses on cutting-edge technologies, groundbreaking innovations and upgrades, or traditional Chinese scientific and cultural aspects within that field, striving to present a multifaceted view of the discipline. Source texts may be selected from foreign research publications, papers, or popular science and technology articles and news reports from internationally recognized websites and periodicals to ensure the accuracy and authenticity of the English language. At the same time, correct value orientation of the content must be ensured to prevent the influence of corruptive views and ideologies and guide students to establish correct worldviews, outlooks on life, and values.

5.3 Designing learning activities in a logical and progressive way

The arrangement of learning activities in each unit should take students' interest and receptivity into consideration. Reading and writing activities should be organized in order of increasing difficulty. For example, each unit may begin with a video introduction to the theme of the unit, followed by tasks of article reading, thematic discussion, structural analysis, reading skills analysis, vocabulary building, and academic writing. Through layered and progressively challenging learning tasks, students will gradually master the fundamental elements of engineering English discourse and enhance their reading comprehension and writing skills. Among these, the training of academic writing can be integrated throughout the entire course. The instruction of academic writing should take into account the writing characteristics of non-native English speakers, using numerous examples of scientific and technical English papers to systematically guide students in mastering the basics and techniques of English

research paper writing. This includes addressing language problems related to crafting titles, introductions, research methods, results, discussions, conclusions, and abstracts, thereby providing linguistic support and services for students' professional learning and academic research.

6. Conclusion

The development of Emerging Engineering Education poses new requirements for the cultivation of engineering talent, demanding simultaneous enhancement of humanistic literacy, language proficiency, and professional competence. As a crucial component supporting students' global competitiveness and comprehensive competence, College English courses must ensure that their textbook development keeps pace with the times, reflecting the integration of interdisciplinary convergence, value guidance, and competency orientation. While emphasizing the deep integration of language, culture and professional knowledge, College English textbooks designed for Emerging Engineering Education should also enhance their moral educational function by exploring the humanistic connotations within disciplinary development and incorporating China's scientific achievements and cultural elements. Future research could further conduct empirical evaluations on the efficacy of such textbooks and explore their adaptability across different universities and specialized backgrounds. Moreover, technological tools like artificial intelligence and big data can be utilized to foster intelligent and personalized compilation and thus continually advance textbook development for Emerging Engineering Education.

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