

Discussion on the Reform of Teaching Content of Architectural Engineering Technology Specialty in Universities

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Abstract: This article mainly discusses the reform of teaching content of architectural engineering technology specialty in universities in order to meet the needs of the current society and promote the all-round development of students. Firstly, it analyzes the concept of education reform and the theory of curriculum reform, which provides theoretical support for the reform of teaching content. Then, combined with the characteristics of architectural engineering technology specialty, the special requirements of the specialty for teaching content are pointed out. At the same time, based on case analysis, this article puts forward a series of specific teaching content reform strategies and suggestions. These strategies include defining reform objectives, optimizing curriculum structure, updating teaching content, innovating teaching methods and reforming evaluation system. These suggestions are aimed at improving teaching quality and cultivating students' comprehensive quality and practical ability. Generally speaking, this article provides comprehensive guidance and reference for the teaching content reform of architectural engineering technology specialty in universities through theoretical analysis, case comparison and strategic suggestions.

1. Introduction

As society and technology continue to advance, the significance of construction engineering technology in supporting national infrastructure and urbanization has grown, leading to heightened scrutiny of its educational standards [1]. Nevertheless, various challenges persist in the higher education landscape for this discipline, including outdated curricula, uniform teaching practices, and a dearth of practical learning opportunities [2]. These issues constrain the educational quality and the holistic development of students [3], underscoring the critical need for reform in university-level construction engineering courses [4].

This article aims to delve into the prevailing educational landscape of construction engineering technology in universities, unpacking its prevalent issues and deficiencies. By doing so, we aspire to formulate tailored reform strategies and recommendations. Our study strives to offer both theoretical underpinnings and practical directives for educational reform in this field, while also serving as a reference point for curriculum overhauls in related disciplines.

The research objectives of this article are threefold: Firstly, to examine the current state of construction engineering technology education in universities and expose its inherent challenges; secondly, to elucidate the imperative and urgency of reforming educational content, thereby clarifying the reform's trajectory and focal points; and thirdly, to propose tailored strategies and recommendations to steer the reform efforts in this vital field of study.

2. Analysis on the current situation of teaching of architectural engineering technology specialty in universities

2.1. Overview of the curriculum

Currently, within the field of construction engineering technology in universities, there is a tendency to prioritize the teaching of theoretical concepts over the fostering of hands-on skills and creative thinking [5]. More precisely, the prevalent curriculum structure typically comprises three strata: fundamental courses for all students, specialized foundational courses, and advanced

professional courses [6]. While the fundamental courses aim to develop students' core competencies and aptitudes, the specialized foundational courses concentrate on imparting discipline-specific knowledge and refining essential techniques. The advanced professional courses, in turn, delve deeper into the intricacies of the field, honing students' expertise and practical proficiency.

Nevertheless, in practical teaching scenarios, factors such as inadequate curriculum design and resource constraints often result in a disconnect between theoretical knowledge and its practical application. This mismatch fails to align with the evolving societal demands for skilled and competent construction engineering professionals.

2.2. Teaching content, methods and existing problems analysis

In the realm of architectural engineering technology education within universities, a common issue is the overemphasis on imparting traditional knowledge and maintaining the integrity of theoretical frameworks, often at the cost of neglecting the integration of contemporary knowledge, cutting-edge technologies, and innovative methodologies [7]. Furthermore, the sluggish pace of updating educational materials prevents them from keeping abreast of the latest industry trends and developments, resulting in a significant mismatch between academic content and industry expectations.

Regarding teaching approaches, despite numerous universities' efforts to incorporate modern techniques such as multimedia-based instruction, case studies, and project-based learning, the actual classroom environment often remains teacher-centered and lecture-heavy [8]. This traditional approach fails to harness students' initiative and creativity effectively, nor does it cater to the growing demand for personalized learning experiences. Additionally, the insufficient emphasis on practical applications hinders the development of students' hands-on skills and innovative thinking.

Upon scrutinizing the current state of architectural engineering technology education in universities, several key challenges emerge, as outlined in Table 1.

Table 1 Analysis of existing problems

Exist problem	Specific description	Influence on teaching quality
The curriculum is lagging behind	Can not meet the social demand for construction engineering and technical personnel.	It limits students' professional development and employment prospects.
The teaching content and methods are single.	Lack of introduction of new knowledge, new technology and new methods.	It reduces students' interest and motivation in learning.
Insufficient practical teaching	Students' practical ability and innovative thinking can not be effectively cultivated.	It affects students' comprehensive quality and career development.
Limited teaching resources	It restricts the improvement of teaching quality and teaching effect.	It limits the possibility of teaching reform and innovation.

These problems not only affect the teaching quality of architectural engineering technology specialty in universities, but also restrict the comprehensive quality cultivation and professional development of students. Therefore, it has become a top priority to reform the teaching content of architectural engineering technology specialty in universities.

3. Theoretical basis of teaching content reform

3.1. Educational reform concept

The modern educational paradigm places a strong emphasis on student-centeredness, holistic development, and personalized instruction. These principles serve as the cornerstone for any educational reform, particularly in reshaping teaching content [9]. First and foremost, the student-centered approach underscores that teaching should revolve around learners, respecting their unique perspectives and differences while fostering their initiative and creativity. When revising teaching content, it's imperative to consider students' interests and needs, designing materials that align with their cognitive abilities and learning preferences to enhance engagement.

Secondly, the concept of holistic development highlights the need for education to nurture

students' growth across all dimensions: knowledge, skills, and qualities. In reforming teaching content, a balance must be struck between imparting knowledge, developing abilities, and enhancing qualities to craft a well-rounded educational experience that cultivates students' overall adaptability. Lastly, personalized education recognizes that each student is unique, with distinct needs and strengths. Tailoring education to fit each individual is paramount. When updating teaching content, it's essential to incorporate differentiated strategies and materials that cater to students' varying characteristics and requirements, thereby fostering their individual growth and development.

3.2. Curriculum reform theory

Curriculum reform stands as a pivotal component within the broader spectrum of educational reform, offering a theoretical framework and guiding principles that are instrumental in shaping the content of instruction. This framework encompasses several key elements:

Firstly, the delineation of curriculum objectives serves as the north star for the entire reform process, dictating both its trajectory and focal points. When approaching the revision of teaching materials, clarity on these objectives is paramount to ensure alignment between content and the larger educational goals.

Secondly, the curation and structuring of course content emerges as a crucial undertaking. This content serves as the vessel for achieving the aforementioned objectives, and its compilation must adhere to principles of scientific rigor, systematic organization, and practical applicability. Efforts to update and refine course materials are essential to maintain their relevance and utility in the evolving educational landscape.

Lastly, the implementation and assessment of the curriculum constitute the final frontier in this reform journey. The former determines the efficacy of the reforms themselves, emphasizing adaptability and responsiveness to the unique needs and circumstances of learners. Meanwhile, the establishment of a robust evaluation system is imperative to objectively measure the impact of these content-related changes and inform future iterations.

3.3. Characteristics of architectural engineering technology specialty

The field of architectural engineering technology is unique in its demands on educational content. This discipline prioritizes practicality, application, and the seamless blend of theoretical knowledge with hands-on experience. Consequently, revamping teaching content should aim to bolster practical instruction, thereby enhancing students' proficiency in applying what they learn.

Furthermore, this diverse major encompasses a breadth of subjects, ranging from architecture to mechanics, materials science, and structural design. Hence, teaching reforms must focus on knowledge integration and interdisciplinary approaches, fostering a holistic understanding and problem-solving skills among students.

Lastly, this major must also nurture students' capacity for innovation and teamwork to align with the dynamic evolution of the construction engineering sector. Emphasizing these skills is crucial for preparing students to adapt and excel in this rapidly changing industry.

4. Case study on teaching reform of architectural engineering technology specialty

In China, many universities have begun the practice of teaching content reform of architectural engineering technology specialty (Figure 1). These reform practices have achieved certain results and provided useful reference for other universities. In foreign countries, some advanced teaching models and reform experiences are also worth learning. These foreign teaching modes and reform experiences are of great significance to the reform of teaching content of architectural engineering technology specialty in China.

By conducting a comparative analysis of teaching content reform cases in architectural engineering technology programs across various universities, both domestically and internationally, we gain insights into their respective strengths and weaknesses. Domestic universities, for instance, often excel in their well-rounded curriculum systems that prioritize the development of students'

practical and applied skills. In contrast, foreign universities tend to emphasize interdisciplinary approaches and fostering innovation, creating an environment conducive to students' comprehensive growth.

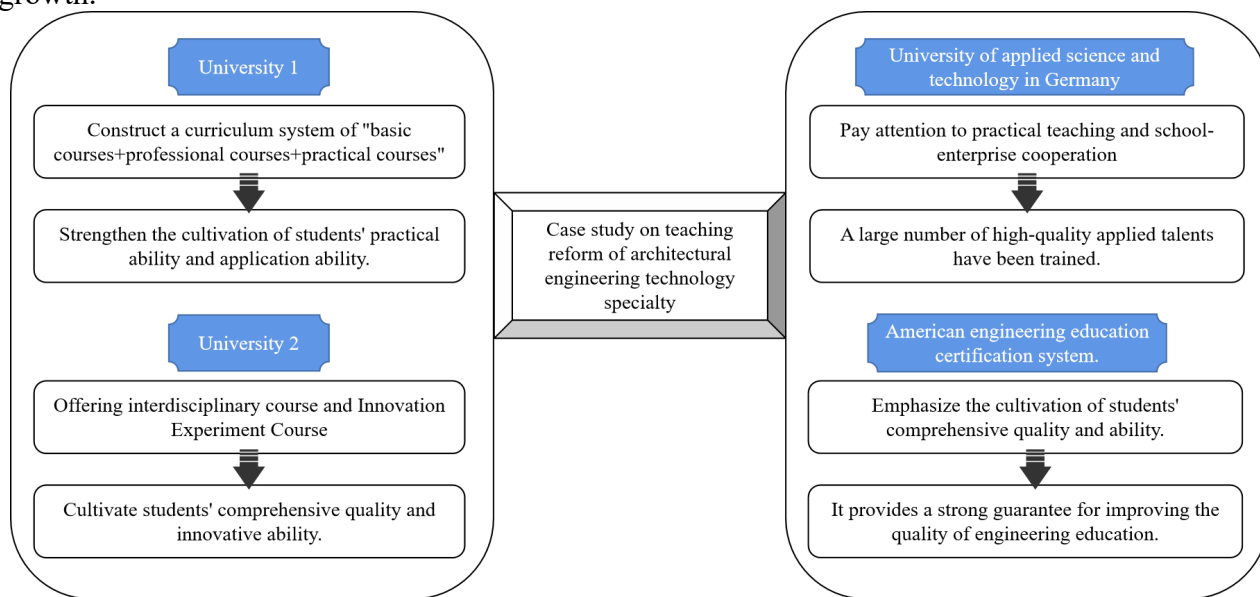


Figure 1 Case analysis

Drawing from these comparisons, we can tailor teaching content reform strategies and recommendations that are tailored to the unique context of China and the specific characteristics of the architectural engineering technology field. This allows us to harness the best practices from both domestic and international settings, leading to more effective and relevant educational experiences for students.

5. Strategies and suggestions on teaching content reform of architectural engineering technology specialty in universities

5.1. Reform target positioning

Before the reform of teaching content, it is very important to make clear the overall goal and specific goal of the reform. This article holds that the overall goal should be to improve teaching quality and cultivate students' comprehensive quality, while the specific goals include optimizing curriculum structure, updating teaching content, innovating teaching methods and perfecting evaluation system. By defining the objectives, we can provide a clear direction and motivation for reform.

5.2. Teaching content optimization

Optimizing curriculum structure is an important aspect of teaching content reform. First of all, we should comprehensively sort out and analyze the existing courses, delete outdated and repetitive course contents, and add new courses that reflect the latest trends and development trends of the industry. Secondly, we should pay attention to the interdisciplinary and comprehensive nature of the curriculum, break down the barriers of disciplines and promote the cross-integration between different disciplines. Finally, practice teaching should be strengthened to improve students' practical ability and application ability.

Updating teaching content is also the key link of reform. Teaching content should keep pace with the times and reflect the latest trends and development trends of the industry in a timely manner. At the same time, we should pay attention to the organic combination of basic and cutting-edge teaching content, not only to consolidate students' basic knowledge, but also to guide students to pay attention to cutting-edge and hot issues in the industry. In addition, the connection between teaching content and engineering practice should be strengthened to improve students' engineering

consciousness and ability to solve practical problems.

5.3. Teaching method innovation

Innovation in teaching methods and approaches serves as a crucial underpinning for the reform of educational content. Universities ought to shift away from the traditional teacher-focused paradigm and embrace a student-centered approach, thereby unleashing students' initiative and creativity. Additionally, it is imperative to utilize a diverse array of teaching techniques, encompassing case studies, project-based learning, and the flipped classroom model, among others. This variety aims to enhance students' engagement and interest in learning. Furthermore, the integration of modern information technology tools, such as multimedia and online platforms, is essential for enriching teaching methods and resources. By harnessing these technologies, universities can elevate the overall effectiveness of their teaching practices.

5.4. Evaluation system reform

Adapting to the new teaching paradigm necessitates reforming the teaching evaluation system. Universities ought to construct a diversified evaluation framework that encompasses both formative and summative assessments, qualitative and quantitative metrics, to holistically and objectively gauge students' academic achievements and overall qualities. Additionally, they should prioritize process and practical evaluations, emphasizing students' learning journeys and hands-on performances. This approach encourages students to value consistent effort and practical application. Moreover, establishing an efficient feedback loop is crucial to ensure timely communication of evaluation outcomes to both students and teachers. This allows for prompt adjustments to teaching strategies and methodologies, fostering a dynamic and responsive learning environment.

6. Conclusions

After a comprehensive examination of the present teaching landscape for architectural engineering technology in universities, this article sheds light on prevalent issues and deficiencies, while emphasizing the significance and urgency of reforming educational content. Drawing from this analysis, tailored reform strategies and recommendations are proposed. These encompass clarifying reform goals, refining the curriculum structure, revitalizing teaching materials, introducing innovative teaching techniques, and enhancing the evaluation system. These proposed measures offer valuable guidance and practical relevance for reforming the architectural engineering technology curriculum in universities.

Looking ahead, the evolving society and advancements in science and technology will present fresh challenges and prospects for the architectural engineering technology curriculum. New technologies, materials, and processes will necessitate updates to teaching content. Simultaneously, the ongoing evolution of educational paradigms and teaching innovations will furnish additional avenues and tools for reforming educational content. Hence, university departments specializing in architectural engineering technology must remain vigilant in tracking industry and educational trends, adapting and optimizing their teaching content and methodologies to align with societal demands and student development.

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