

Undergraduate Architecture Education Driven by International Engineering Accreditation and Architecture Evaluation

Shiqian Cai*, Yongzhong Lou, Xi Zhao

School of Architecture and Civil Engineering, Huizhou University, Huizhou, China

Email: *860312932@qq.com

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Abstract

Driven by international engineering accreditation and architecture evaluation, the undergraduate architecture at Huizhou University proposes an innovative curriculum plan to cultivate the graduate attributes. This paper is illustrated by the design project for second-year students, launched by six universities across different regions in China. The fruitful results show that it is a beneficial attempt for undergraduate architecture education in curriculum renovation.

Keywords

Architecture Education, International Engineering Accreditation, Architecture Evaluation, Design Project

1. Introduction

In 2015, the Ministry of Education, the Ministry of Finance, and the National Development and Reform Commission on Thursday jointly released a selected list of universities and colleges, which will participate in the country's construction plan of world-class universities and first-class disciplines. Afterward, double first-class universities and disciplines at the provincial levels sprung up. The undergraduate architecture program at Huizhou University was selected as a first-class discipline. To make the undergraduate program a national-class discipline, the approach driven by International Engineering Accreditation (IEA) and Undergraduate Architecture Evaluation (UAE) is proposed.

There are three agreements covering mutual recognition in respect of tertiary-level qualifications in engineering internationally: The Washington Accord signed in 1989 was the first, it recognises substantial equivalence in the accredi-

tation of qualifications in professional engineering, normally of four years duration. The Sydney Accord commenced in 2001 and recognizes substantial equivalence in the accreditation of qualifications in engineering technology, normally of three years duration. The Canberra Accord signed in 2008, is intended to facilitate the portability of educational credentials between the countries whose accreditation/validation agencies signed the Accord. China was accepted as one of the members in 2011. Undergraduate Architecture Evaluation, launched by the Ministry of Housing and Urban-Rural Development, is run by the government authority, which is guided by the National Supervision Board of Architectural Education with the aim to supervise architecture education nationwide.

Under the circumstances, the undergraduate program intends to meet the standards of the national first-class discipline. Based on our previous attempts and achievements (Li, 2018; Li & Dong, 2019; Li et al., 2021), this paper proposes a new approach to undergraduate architecture education driven by international engineering education and architecture evaluation.

2. Graduate Attributes and Professional Competences

Graduate attributes, are defined as “a set of individually assessable outcomes”, for educational qualifications in the engineer, engineering technologist and engineering technician tracks. The graduate attributes serve to identify the distinctive characteristics as well as areas of commonality between the expected outcomes of different types of programs. This paper focuses on the graduate attributes of the undergraduate architecture program. The graduate attributes are intended to assist Signatories and Provisional Members to develop or review their outcomes-based accreditation criteria for use by their respective jurisdictions. Graduate attributes also guide bodies in developing or revising their accreditation systems with a view to seeking signatory status. **Table 1** displays the graduate attributes and professional competences of IEA and UAE respectively. International engineering accord on graduate attributes is divided into two sets of competence profiles, namely: complex engineering problems and broadly-defined problems, while the undergraduate architecture program is separated into four sets: engineering knowledge, engineering ability, general ability and engineering attitude. Complex engineering problem activities include problem analysis, synthesis, implementation, and operation while the broadly-defined problems are evidenced by the activities such as communication, management, ethical practice and judgment. The graduate attributes specified by the UAE are in accordance with the IEA but in four categories.

Guided by the above-mentioned graduate attributes and competences, the undergraduate architecture program in Huizhou University develops a comprehensive five-year teaching curriculum to cultivate talents (**Table 2**).

The undergraduate program is a five-year Bachelor of Architecture degree with 145 credit hours, covering the theoretical and practical aspects of designing, planning and analyzing. Adhering to the graduate attributes and professional competences specified by IEA and UEA, the five-year curriculum for architecture

Table 1. Graduate attributes and competences by IEA and UAE (International Engineering Alliance Graduate Attributes & Professional Competencies, 2021).

International Engineering Accords		Undergraduate Architecture Evaluation	
Engineering Knowledge		Natural Science and Architecture Knowledge	Engineering Knowledge
Problem Analysis	Complex Engineering Problems	Design Problem Analysis	Engineering Ability
Design/Development of Solutions		Design of Solutions	
Investigation			
Tool Usage			
The Engineer and the World			
Ethics		Lifelong learning	
Individual and Collaborative Team Work	Broadly-defined Problems	Individual and Collaborative Team Work	General Ability
Communication		Tool Usage	
Project Management and Finance		The Architect and the World	
Lifelong Learning		Project Management and Ethics	Engineering Attitude

Table 2. Five-year curriculum in architecture program of Huizhou University.

Year	Level	Foci	Project	Core Courses
Fifth year	Professional level	Professional architects training	Graduation project	
Fourth year	Comprehensive level	Sketch design presentation	Sketch design	Comprehensive Architecture Design Architectural Technology
Third year	Intermediate Level	Architecture Technology	Construction Competition	Architecture Design III; Materials and Methods of Building Construction
Second year	Intermediate Level	Design	Design Project	Architectural Design II;
First year	Foundation level I	Form and expression	Architectural Model	Architectural Design I; Architecture Introduction

education is made to immerse students in a focused education, whose aim is to make preparation for professional in architecture. The curriculum is divided into four levels, namely: foundation level, intermediate level, comprehensive level and professional level.

3. Case Study

According to the curriculum, second-year students at the intermediate level are expected to finish a design project. The project for second year (fourth semester) is exemplified to illustrate the curriculum system. A design project is co-developed by six universities: Huizhou University, Wuyi University, Jinan University, Tourism College of Changchun University, Changchun Institute of Technology and Changchun University of Architecture & Civil Engineering. In 2019, the design project was initiated by Huizhou University and more than 1000 students participated in the competition. The project is based in Huizhou historical site, Tieluhu Historical District, Qiaodong, Huizhou, which has been one of the officially protected monuments and sites in 1990, and afterwards it has been listed one of the provincial historical sites in 2014.

Huizhou is located in the southeast of Guangdong Province and at the northeastern end of the Pearl River Delta, is a historical city in Guangdong Province called Xuzhou Prefecture and Zhenzhou Prefecture respectively in ancient times. It has been included into the administrative division system for more than 1400 years, and been a political, economic, cultural and transportation center of Dongjiang River Basin since ancient times. Tieluhu Historical District (**Figure 1**), with the history of more than 400 years, was built in the Ming Dynasty by the Chen family and descendant. It is one of the most influential and oldest architectures in Huicheng District. Next to the Dopo Hall (named after Su Dongpo, a great poet and politician in Song Dynasty), it covers 2.2 hectares, 700 metres long. However, with the rapid development of urbanization and industrialization, Tieluhu fell into decay since 1980s. In the new era, the historical cultural heritage gains an increasing attention and thus there is an urgent call to protect these cultural heritages. Scholar Zhou Xinde¹ claims that the architecture in this site is of great value to the city history and planning. Liu Hanxin² contends that the historical architecture is the best representation of the city development one that once destroyed it can never be recovered, adding that more protection should be made to these architectures.

Under this background, the project was undertaken to restore or recreate the historical architecture. **Figure 2** shows the topography of land use in Tieluhu. The historical site boasts for two Protected Historic Sites, six historical buildings, Dongpo Hall, Dongjiang River, Dongpo Granary, Donghu Hotel (Revolutionary site), etc.

The newly renewal project covers 2500 - 3000 square meters, including at least one to two studios: bookstore, drama studio, calligraphy and paintings studio and clubs studio. The general requirements are specified as follows: public facilities, lobby, restroom, non-barrier design pathway, parking lots and the green plot ratio is no less than 20%.

The competition attracted more than 1000 students from six universities, receiving more than 150 design projects. Students from Huizhou University got

¹https://k.sina.com.cn/article_2131593523_7fd8933020014wbh.html.

²https://k.sina.com.cn/article_2131593523_7fd8933020014wbh.html.



Figure 1. Landscape of Tieluhu historical site.



Figure 2. Topography of land use in Tieluhu.

one first prize, two second prize, five third prize and several winning prize, with which the total winning awards ranked the first among these six universities. The achievements in our program show that the curriculum driven by the graduate attributes is a success, which facilitates creativity, collaboration, critical thinking and problem-solving ability (Figure 3).

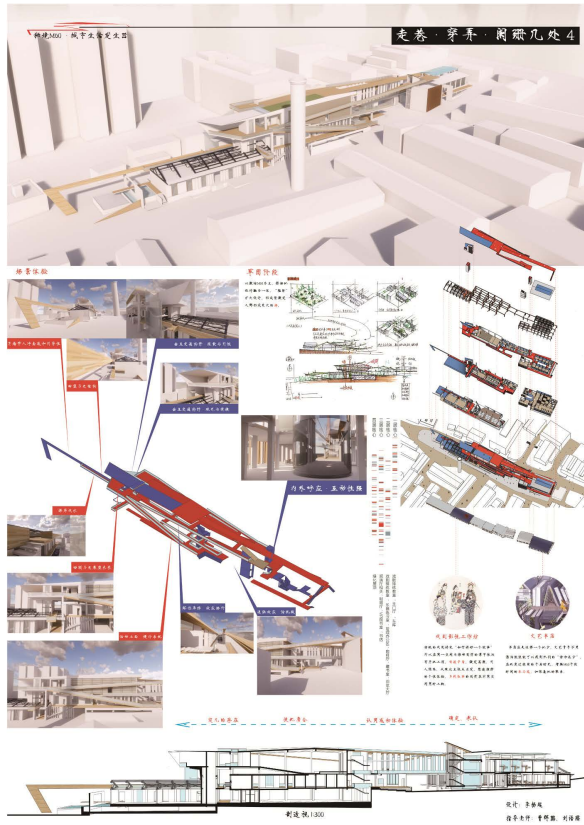
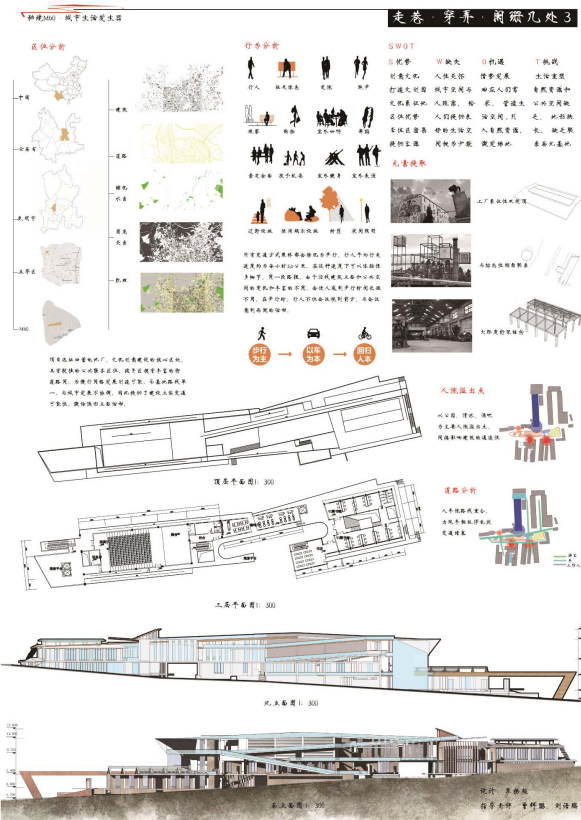
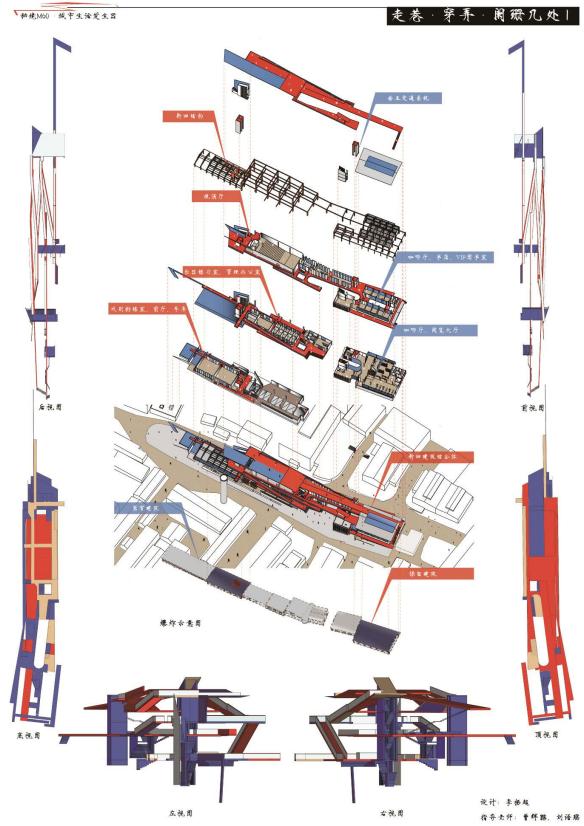


Figure 3. First prize project from Huizhou University.

4. Conclusion

Thanks to the double-first-class discipline building and other teaching platforms (Li & Dong, 2019), the undergraduate architecture program yields a fruitful achievement. This paper focuses on the curriculum design renovation and is exemplified by the second-year design project—cultural architecture protection and renovation in Huizhou, which greatly encourages students to participate in this kind of project. It is beneficial to curriculum innovation and talent cultivation. Besides, it is hoped that this new curriculum design provides insights into undergraduate architecture program education.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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