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# An investigation and research on the teaching mode of civil engineering courses in Korean universities

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**Abstract:** Civil engineering is a traditional engineering specialty, its traditional teaching mode is relatively fixed, and it is difficult to adapt to the development of the times in terms of curriculum and assessment mode. In order to broaden our horizons, learn from each other, and reform our educational concepts, a survey was conducted on the curriculum, assessment methods and personnel training models of civil engineering majors in four universities, namely Dong-Eui University, Pukyong National University, Kyung Sung University and Tongmyong University in Busan, South Korea. The purpose of this paper is to study a diversified curriculum teaching mode of civil engineering specialty suitable for China's national conditions.

**Key words:** Korean universities; civil engineering professional; curriculum; curriculum assessment

## 1 Introduction

Since the early 2000s, China has rapidly become the world's largest infrastructure market as a result of its reform, opening up and urbanization. The rapid development of the past 30 years has created a huge scale of enrollment of civil engineering specialty in our country. As early as 2014, Zuo Kun proposed that China's urbanization and infrastructure construction have shifted from a period of high-speed growth to a period of stable development. Even with the implementation of measures such as new urbanization to expand domestic demand, the scale of the domestic infrastructure market is difficult to expand on a large scale. It is expected that within 10 years, it will be difficult to have large-scale new construction demand of expressways, high-speed railways, ports and airports, and the problem of overcapacity in the construction industry will gradually appear [1].

With the slowdown of domestic infrastructure construction in recent years, the demand for civil engineering professionals is gradually decreasing, and the competition is becoming more and more fierce. With the deepening of the Belt and Road Initiative, the pace of "China infrastructure" moving overseas is gradually accelerating. Therefore, it is urgent for universities to cultivate civil and architectural skills with international vision and professional skills [2]. However, there are differences between China and foreign countries in terms of national conditions, teaching concepts and training modes [3], and there are still urgent problems to be solved in the talent training of aging curriculum structure and single assessment method in Chinese universities. For example, the proportion of cross-major and interdisciplinary courses is low, so it is difficult to meet the needs of the digital and intelligent era. Many courses still adopt the mode of process

assessment + final assessment, and it is difficult to effectively cultivate students' ability to solve practical engineering problems.

To solve these problems, during 2019-2023, in-depth research was conducted on the civil engineering professional training mode of the South Korea Dong-Eui University, Pukyong National University, Kyung Sung University and Tongmyong University. Starting from the differences in talent cultivation models between China and South Korea, the characteristics of Korean universities in the curriculum design and assessment mode of civil engineering majors were studied, aiming to explore teaching reform ideas for civil engineering majors and even engineering majors in domestic universities, and provide reference directions.

## 2 Course setting

In the civil engineering undergraduate course system of Dong-Eui University, the professional courses are divided into four categories: basic education course, professional basic course, professional core course and professional deepening course. The basic education courses are more distinctive, mainly including "professional exploration and future planning" and "meetings with instructors", which are offered every semester by professors from different professional areas according to the characteristics of their professional direction. Students can choose the direction of specialization they want to pursue in the future according to their preferences, and then choose the corresponding professors. In addition, the courses are divided into knowledge learning, knowledge exploration, experimental practice and cooperative learning. In this way, the learning characteristics and learning objectives of different courses, whether teacher teaching or student learning, as well as the final course assessment method, are all developed around this feature.

In general, from the setting of basic education courses to the distinction of course types, it is very beneficial to let students understand what courses they should learn from the perspective of future employment, what they learn in the courses, why they take the courses, and what they need to master in the courses. From the point of communication with the undergraduate students at this school, they generally have a strong sense of autonomous learning, as well as certain planning for their future career development. Compared to the mentality of many domestic college students: " I don't know why learn this, and don't know what is the use. I learn it when the teacher lets me learn; I learn for the sake of graduation, and successful graduation is the goal of learning", their career planning education is walking ahead of us, in which, the fine curriculum system setting has played a role that can not be ignored.

## 3 Course assessment

Most courses use a 100-point assessment system similar to ours, and the final grades are A +, A, A, B, C, D, E, and F. The composition of this 100-point scale is much more detailed than the simple model of usual grades + test scores, and different courses also have different requirements for the distribution of grades.

### 3.1 Examination

Although modern Korea is deeply influenced by western culture, the housands of years of Confucian culture makes Korean people attach great importance to study and examination. The examination method is generally similar to that of domestic universities, but it is more flexible in time and content. For the lecturer, he has a complete decision on the time, content and form of the exam. In addition to the mid-term exam and the final exam, a large number of ordinary process exams will be interspersed throughout the whole semester, and each exam and homework is directly related to the final score, which gives college students enough learning pressure.

### 3.2 Achievement composition

The diversified course assessment mode is more conducive to reflecting the real level of students. This survey found that the course assessment mode in South Korea is flexible and diversified, which is very valuable for reference. Taking

Dong-Eui University as an example, the course assessment and evaluation items include midterm and final exams, knowledge competition, homework, team homework, attendance, other 1, other 2, other 3, publication, participation, etc. Course participation consists of classroom Q&A and classroom discussion, which can be divided into 12 items. Of course, it is not that the evaluation of each course needs to cover all the evaluation items, but the lecturers of the course will decide which evaluation items to use as the evaluation criteria of the course according to the characteristics of the course and the teaching methods used, and determine the proportion of different items in the final results.

3.3 Distribution of grades

Due to the inherent variability between courses themselves, it is difficult to have a "uniform standard" that can accommodate all courses. Therefore, processing the final grades of a course to meet a reasonable distribution can equalize as much as possible the impact of differences between teachers and the difficulty of the course or the difficulty of the exam on the performance of students. On the basis of not disrupting the ranking of grades, bringing the scores to a relatively similar range is obviously fairer and more conducive to promoting a healthy style of study.

In response, Korean universities will set the score distribution criteria according to the nature of the course. Internship courses, such as GIS practice, allow a higher percentage of A's and B's; some theoretical courses, such as material mechanics, structural mechanics, applied basic engineering, allow the lowest A ratio (25%); professional courses paying more attention to practice, such as basic surveying, civil engineering construction, allow a slightly higher percentage of A's (30%). There are proportionality requirements for each grade. Taking structural mechanics and fluid mechanics as examples, the proportion of people with final scores in A, B and C cannot exceed 25%, 40% and 35%, respectively, while there is no requirement for the number of D-F.

3.4 Performance evaluation and adjustment

The proportion of the above score distribution is directly set in the network teaching management system. The teacher must correct the overall score before recording the score, so as to ensure that the distribution meets the requirements of the course before the final score can be successfully recorded. Professor Li Nanzhu (이남주) from, Kyung Sung University, introduced two interesting performance correction methods, as shown in Figure 1.

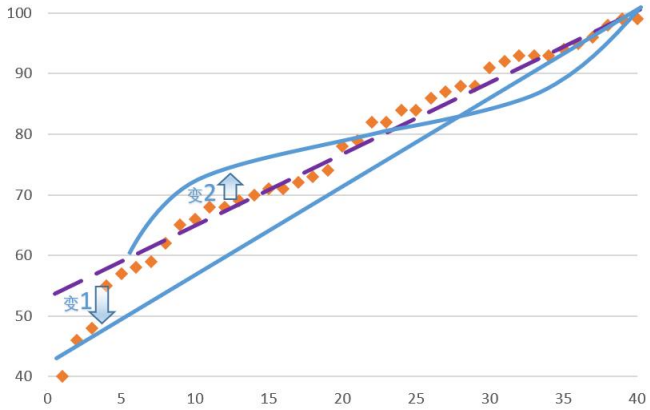


Figure 1. Schematic diagram of the adjustment of grades

The horizontal axis represents the ranking of students' final scores from low to high, and the vertical axis represents the scores. The discrete points in the figure represent the score of each student. These discrete points are fit to an oblique line (dotted line in the figure), then the line shows the distribution of scores in the whole class. Adjust the slope of the oblique line (change 1 in the figure), so that you can adjust the distribution of grades without changing the ranking. This method can reduce the number of people in each scoring range, but the disadvantage is that the students who have just passed 60 points are adjusted to below 60 points. If it is necessary to ensure that the total number of people in the 60-100

range remains unchanged and only adjust the number of people in each ten range, another adjustment method can be used (change 2 in the figure).

## 4 Conclusion

In the past 20 years, China's civil engineering industry has achieved a leap of development and is at the forefront of the world. However, compared with the four Korean universities surveyed this time, we do have a lot to learn and improve in the talent training of civil engineers. Since the two countries not only have different education systems, but also have great differences in their professional settings and curricula, it is obvious that completely copying their methods is not suitable for our national conditions. Therefore, how to take advantage of their strengths and complement our weaknesses, establish a diversified curriculum assessment mechanism for civil engineering majors in colleges and universities that is suitable for our national conditions will be the next step to be thought about.

## Conflicts of interest

The author declares no conflicts of interest regarding the publication of this paper.

## References

[1] Zuo K. Development vision of China's infrastructure construction in the next decade [EB / OL]. (2014-10-29). https://www.mckinsey.com.cn//未来十年中国基础设施建设的发展前瞻/

[2] Zheng B. 2023. Research on the overseas social responsibility status of central construction enterprises. Beijing Jiaotong University.

[3] Li R, Li WJ, Liang B, et al. 2023. Take the cooperative project of Kyushu University of Technology in Japan as an example. *Chinese Educational Equipment*, 23:160-163. DOI:10.13492/j.cnki.cmee. 2023.23.028.