



Research on Curriculum System Construction of Civil Engineering Specialty Based on Origin Statistical Software

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Abstract. In view of the current situation of the ideological and political research of civil engineering courses, this paper, under the background of moral education in colleges and universities in the new era, based on Origin statistical software, sets out the basic task of multi-dimensional construction of the ideological and political system of civil engineering courses, combined with data statistical analysis, puts forward a set of curriculum ideological and political construction method suitable for civil engineering courses. Combined with teaching practice, this paper adopts Origin data statistical software analysis and ABAQUS model analysis software to establish data information processing model and conduct research and analysis through the steps of creating parts, defining section attributes, defining boundary conditions and post-processing of grid division, so as to improve the teaching mode and method. In order to achieve the purpose of civil engineering curriculum education.

Keywords: civil engineering · course education · origin statistical software · data information processing model · ABAQUS model analysis

1 Introduction

In his speech at the National Conference on Ideological and Political Work in Universities held in Beijing in 2016, Xi stressed that “moral education should be regarded as the central link, ideological and political work should be carried out throughout the whole process of education and teaching, so as to achieve all-round education and create a new situation for the development of China’s higher education.” And then started the ideological and political reform of Chinese university curriculum. In 2019, Xi Jinping presided over a forum for teachers of ideological and political theory courses in schools in Beijing and delivered an important speech, stressing that “we should adhere to the unity of explicit and implicit education, explore ideological and political education resources contained in other courses and teaching methods, and realize all-round education for all students.” “Solve the problem of coordination between various courses and ideological and political courses”. On May 28, 2020, the Ministry of Education issued the Guiding Outline for Ideological and Political Construction of Curriculum in Colleges and Universities [2], proposing that curriculum ideological and political construction “should be

comprehensively promoted in all colleges and universities and all disciplines and majors in China”.

The outline emphasizes that the curriculum ideological and political teaching system should be designed scientifically, and the construction of curriculum ideological and political education should be promoted according to the characteristics of disciplines and specialties. As a traditional engineering major, civil engineering has strong practicality and application [5]. We should combine the specialty characteristics, promote the construction of curriculum ideological and political construction, dig into the specialty humanities education resources, and construct the curriculum ideological and political system with distinctive characteristics. This paper explores the multi-dimensional construction method of the ideological and political system of civil engineering curriculum, and uses the construction method to carry out the ideological and political education of civil engineering curriculum, so as to achieve the purpose of educating students in the professional curriculum.

2 Present Situation of Ideological and Political Course of Civil Engineering Specialty

The purpose of curriculum ideological and political research is to break the current situation that ideological and political education and professional education are completely separated from each other, to truly implement the thought of moral cultivation into the whole process of professional teaching, and give full play to the ideological and political efficiency of each link of curriculum teaching [1]. However, the current situation of ideological and political development in colleges and universities is not satisfactory. Existing researches have explored and practiced the overall orientation of curriculum ideology and politics and the application of specific courses to varying degrees, and have formed certain guiding theories and implementation modes and paths. However, the systematic theory of curriculum ideological and political construction method has not been refined and summarized. Civil engineering major is not ideal in the course of ideological and political promotion, implementation and effect. Ideological and political work is difficult to run through the whole process of civil engineering education and teaching. Combining with teaching practice, this paper puts forward a set of curriculum ideological and political construction method suitable for civil engineering major. It is of great significance to realize the ideological and political function of civil engineering curriculum.

3 Multi-dimensional Construction Method of Curriculum Ideological and Political System

3.1 The Ideological and Political Elements of the Course Are Integrated with the Knowledge Points of Specialized Courses

Civil engineering professional discipline foundation courses, professional core courses and many courses, such as professional direction course scientific and reasonable to strengthen the connection between the various curriculum, and which runs through the

ideological and political, will eventually course comprehensive ideological elements into the whole process of the construction of the professional course, each course will be together, certainly will raise the civil engineering specialized course education a highly. On this basis, the viewpoints of constructing the curriculum ideological and political system in multi-dimension are put forward, and the examples of how to establish the curriculum ideological and political system in multi-dimension are summarized. A variety of ideological and political elements run through the course, horizontally connected. Multiple courses are connected vertically through ideological and political elements [3]. The construction of the ideological and political system of civil engineering courses from vertical and horizontal dimensions is a qualitative leap over of the ideological and political system of civil engineering courses under the background of moral cultivation in colleges and universities in the new era. Actively explore typical cases, intersperse them into the ideological and political teaching of civil engineering courses, and construct a multi-dimensional and reasonable curriculum ideological and political system, which has a milestone significance for the curriculum ideological and political of civil engineering courses.

3.2 Professional Courses and Ideological and Political Theory Courses Are in the Same Direction and Multi-dimensional Integration

The major courses of civil engineering mainly focus on the training of professional talents for the construction of various engineering facilities in China. The construction of roads, Bridges and tunnels, all kinds of municipal projects, including all kinds of industrial buildings, civil buildings and other engineering facilities, for the life of the people to provide essential engineering entities. The combination of ideological and political education in civil engineering courses can guide students to form correct thoughts and concepts. Meanwhile, the combination of great achievements in the field of civil engineering in China can make students better full of national pride, establish cultural confidence, and reverse promote the enthusiasm of students to learn professional courses. The ideological and political curriculum, which focuses on the cultivation of ideological ideas, is the main field of ideological and political education for college students in China. Now opened in universities of “thought morals tutelage and legal foundation”, “introduction to basic principle of marxism”, “introduction to MAO zedong thought and theory system of socialism with Chinese characteristics” and other important education courses, training on college students’ mind and thinking has an important guidance role orientation, guiding college students positive, do the successor of the revolution, Cultivate correct ideals and beliefs of college students.

The ultimate goal of both curriculum and ideological and political courses is to cultivate people through virtue. Full-time ideological and political teachers should guard the main position of ideological and political courses and cultivate people with the thought of socialism with Chinese characteristics for a new era. Professional curriculum teachers should always regard curriculum ideological and political as the effective entry point between theory and practice and the bridge between theoretical knowledge and engineering practice, so as to implement curriculum ideological and political with good political accomplishment, noble scientific spirit and effective education and teaching means. Professional courses and ideological and political theory courses are in the same direction,

forming multidimensional integration, cultivating students to have correct ideological and moral character, actively create a better future, realize their ideals and values in life, bravely shoulder the glorious mission endowed by The Times, and comprehensively improve the ideological, political and political quality of college students.

3.3 Multi-dimensional Integration of Online and Offline

Through the online and offline hybrid teaching mode, ideological and political teaching is not only carried out offline, but also integrated into online teaching activities, which has a good teaching effect. In the face of the rapid development of digital teaching, civil engineering courses should also pay attention to close to students through fashionable and efficient interactive forms. Specialized course teachers should make full use of modern means such as information technology, such as online live, wisdom and classroom learning platform, strengthen innovation expression, teaching interaction, enrich the teaching process, to build an online and offline courses education teaching mode, widen course education form of propagation and radiation influence, deepen and curing value guidance, making education vivid, do real professional courses.

The results of the curriculum reform are mainly reflected in three aspects: the online and offline hybrid teaching mode is that students take online learning as preview and supplement, and coming to class with questions creates hunger for their learning and arouses their learning enthusiasm. It is better for teachers to expand the breadth and depth of knowledge in class. Online learning enhances students' independent learning ability, and face-to-face classroom teaching adds a link of "teacher's explanation, discussion and extended teaching", which better solves students' problems in the process of simulation and experiment after class, improves students' engineering application ability, and promotes the deep integration of theory and practice. Introduce scientific research achievements and international cutting-edge technology, let students understand the status quo through extended reading, stimulate students' patriotic enthusiasm and sense of responsibility, and reflect value guidance in the teaching process.

4 Curriculum Ideological and Political Teaching Practice

Taking the basic principle of concrete structure as an example, ideological and political education runs through the whole process and every link of professional course teaching mainly from the teaching content and teaching method.

4.1 Ideological and Political Elements into the Course Content

The basic principle of concrete Structure is the core compulsory course of soil-based engineering major. The course is 64 h and 4 credits, which is open to third-year undergraduates majoring in civil engineering. The courses are introduction to Civil Engineering and mechanics of materials, followed by concrete structure design and seismic design of building structures. It is the first "structural design course" of civil engineering major. In this course, the basic theories such as mechanical properties, section calculation and construction of various concrete basic components will be introduced. To train the students

to establish the basic knowledge system of concrete design principle, comprehensive design ability and civil engineering practice ability.

As mentioned above, basic principle of concrete structure includes critical theory and method of structure design theory and method which are formed gradually improve after a few generations, which contains the predecessors of innovation, the pursuit of excellence, the pursuit of perfect scientific spirit and scientific attitude and scientific method is a good course education material, can be concise and play its role in teaching, Stimulate students' interest in scientific research [4]. Secondly, a large number of practical engineering cases are involved in the course explanation, including major landmark engineering cases and some engineering accident cases, which are used to cultivate students' pursuit of excellence in the spirit of innovation, craftsman spirit, legal awareness of responsibility, engineering ethics awareness and professional standard quality [4]. In addition, a large number of outstanding figures and expert masters are involved in important theoretical methods and engineering cases, including predecessors, experts and scholars in theoretical methods, technological innovation and engineering application, etc., and their deeds are introduced. It plays a good role and significance in cultivating students' feelings of family and country, scientific spirit, craftsman spirit, sense of responsibility, sense of responsibility and humanistic care.

4.2 Improve Teaching Model and Method

4.2.1 Introduction of Applets and Origin Data Statistical Analysis

According to the different stress conditions, concrete structural members are mainly divided into bending members, compression members, tensile members and torsion members. In the calculation of the bearing capacity of various components and section design, the teacher will emphasize the non-uniqueness of the design, that is, when the material strength or section size changes, the section reinforcement changes accordingly. At this time, wechat small program concrete structure toolbox is introduced, so that students can conduct comparative analysis of different modules and deeply understand the principle of non-uniqueness in component design. Through the fashion and efficient interactive form close to students, inspire students to be brave in innovation, the pursuit of perfect scientific spirit, scientific attitude and scientific methods, in the course teaching can be condensed and play its role, stimulate students' interest in scientific research.

When learning the mechanical properties of concrete structure materials, the stress-strain constitutive relationship of concrete is the focus of learning. At this time, the Origin data analysis software is introduced and the constitutive relationship of concrete can be visualized through the input of experimental data (as shown in Fig. 1 and Fig. 2). Through the application of Origin data analysis software, not only can we better grasp the stress and strain relationship of concrete, but also inspire students to be good at using the software to learn efficiently and quickly, effectively stimulate the strong scientific research exploration of civil engineering students, and cultivate scientific and rigorous learning attitude.

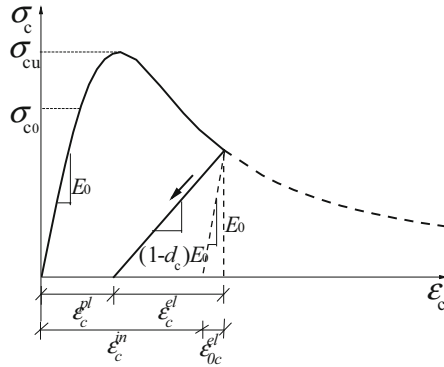


Fig. 1. Origin data statistical analysis (concrete constitutive relation).

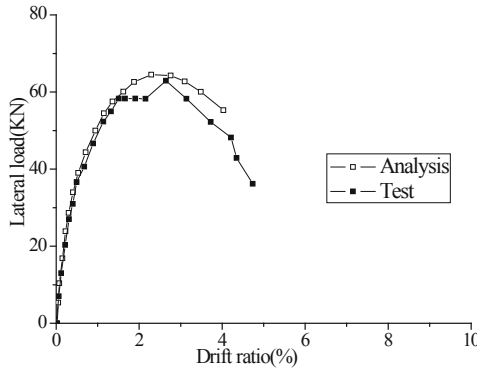


Fig. 2. Origin data statistical analysis (simulation curve).

4.2.2 Data Information Model into Teaching

The basic principle of concrete structure is based on experiment. In addition to classroom learning, it is necessary to strengthen the teaching link of experiment and accumulate perceptual knowledge. Finite element analysis software is an important supplementary means of experiment, which can predict the bearing capacity and failure process of experiment, and is of great significance for guiding experimental teaching. Such as plate punching experiments, node using online live on finite element analysis of ABAQUS platform, through the network teaching platform will xi'an traffic engineering college instruction to students, students are required to use finite element software ABAQUS to establish experimental model and numerical calculation, get the failure process and the stress distribution (as shown in Fig. 3, Fig. 4). The application of finite element analysis software in experimental teaching can better cultivate students' hands-on ability, independent inquiry ability and innovative spirit.

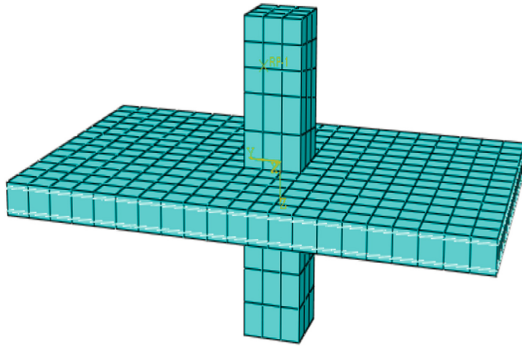


Fig. 3. Finite element modeling.

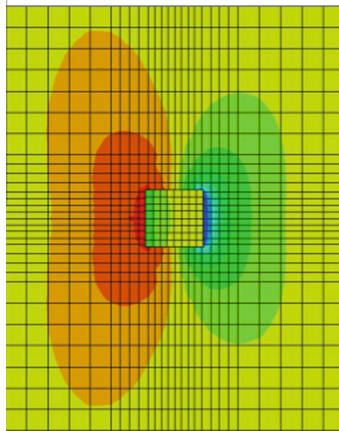


Fig. 4. Simulation results.

4.2.3 A Combination of Teaching Methods

Through multimedia education technology and the network teaching platform of Xi'an traffic engineering institute, the reform of teaching concept, teaching process and teaching mode is promoted. Pay attention to the comprehensive implementation of “online + offline hybrid” and “flipped classroom” teaching mode, and introduce case teaching method, combined with ideological and political elements and professional knowledge of the “melting point”, to achieve the course ideological and political affairs of the silent effect.

5 Conclusions

Based on the basic task of the construction of curriculum ideological and political system of civil engineering major, this paper puts forward a series of multidimensional construction methods of curriculum ideological and political system. It includes: multi-dimensional integration of ideological and political elements of courses and knowledge

points of professional courses, multi-dimensional integration of professional courses and ideological and political theory courses in the same direction, and multi-dimensional integration of online and offline courses. Taking the basic principles of concrete structure as an example, this paper puts forward a series of teaching methods. Ideological and political education runs through the whole process and each link of professional course teaching. It has realized the fundamental task of moral education in colleges and universities in the new era.

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