Research on Teaching Reform of Engineering Management Major Based on Modern Information Technology

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Abstract

With the increasing development of modern information technology, such as Architectural cloud courseAPP, super star learning APP and other teaching software, as well as BIM technology in the construction industry, all provide new ideas for the teaching of engineering management. This paper starts from how to apply modern information technology to the teaching activities of engineering management, carries on the teaching reform research from the teaching content, teaching method, teaching practice and other aspects, guides the students to understand and accept more easily, so as to make the teaching work towards positive interactive development.

Keywords

Research, Engineering Management Major, Modern Information Technology.

1. Introduction

In recent years, scholars at home and abroad have adopted many teaching methods to improve the teaching of architecture courses. The teaching history of the Department of Architecture at ETH Zurich tends to learn the knowledge of architecture through hands-on construction. The teaching organization is carried out in the form of workshops combined with small experimental courses, so that students can have the opportunity to focus on the experience of material properties, processing methods, dismantling and assembly in class [1].Lin Tao, a teacher from Changsha University, proposed that through the introduction of multimedia teaching and the display of a large number of models of architectural appearance and structure, students could have the opportunity to have direct emotional contact with architecture, and the original boring and flat teaching could become vivid, three-dimensional and imperceptib, which would increase their enthusiasm and interest in learning [2]. Wang Yingzi et al. from Huazhong University of Science and Technology created a course outline based on the framework of "competency-quality-knowledge" in the course of "Building architecture" and a teaching model of strengthening the cultivation of students' various abilities by means of teamwork project design [3].Wang Jianchao and others from Shenyang Jianzhu University have achieved phased results by integrating BIM technology into the teaching of professional courses in architecture colleges and universities [4]. The course content of engineering management is complex and numerous, which requires students to have certain spatial imagination ability and strong theory, application and practice. In addition, some contents in the textbook have fallen behind the development of modern construction industry, which brings difficulty and challenge to the teaching work of this course [5]. Therefore, through the reform of teaching methods, teaching content, teaching practice and other aspects combined with modern information technology means, this study will transform the boring and difficult engineering management courses into vivid, interesting courses that students can understand better, and then construct the teaching quality evaluation index system to evaluate the teaching reform results.

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2. Analysis of teaching difficulties in Engineering management major

Through literature research and interviews with teachers and students of engineering management major, the following problems exist in the teaching of engineering management major in local universities at the present stage:

(1) Teaching mode: Up to now, the teaching of professional courses is mainly taught by teachers in class, assisted by teaching videos and other methods. However, for some courses that require spatial imagination ability, for example, in the course of building architecture, although the students watched the construction video, they still could not distinguish the structures such as flood water and drip water, and the platform beam and slope beam of stairs.

(2) Teaching content: With the development of building technology, the emergence of new building materials and the change of building functions, great changes have taken place in the concept of architectural design and the content of architectural structure. However, the teaching materials used in the course, including some of the latest versions, are generally out of date.

(3) Teaching practice: Engineering management requires both relevant theoretical knowledge and practical operation ability. How to combine the two so that students can deeply understand and solve practical problems is a difficult point.

3. Analysis on the Teaching reform of Engineering Management Major in modern information technology

At present, the modern information technology applied in the major of engineering management mainly includes teaching software such as building Cloud course and Super Star Learning Pass, as well as BIM technology in the construction industry. Modern information technology can be used in the design of teaching content, teaching method and teaching practice [6].

3.1. Innovate teaching resources and optimize teaching content

Engineering management courses need to increase relevant knowledge and skills according to the development trend of modern information technology, such as project management software, cloud computing, big data analysis, etc. At the same time, we also need to pay attention to the cultivation of students' innovative thinking and practical ability to improve the competitiveness of talents.

Learning knowledge should not only be limited to the knowledge in textbooks, but also should learn real-time and updated modern theories and technologies. Modern information technology has brought us a huge amount of knowledge, and students may have no way to start in the process of learning. Therefore, teachers need to construct learning framework, build learning platform and plan learning direction for students. As shown in Figure 1, under the guidance of the teacher, the teacher provides the learning framework, combines the teaching resources of the teacher and the learning resources collected by the student, and becomes the shared resources of this course through the processing and integration of the learning software.



Figure 1. Framework of innovative teaching resources

3.2. Improve teaching methods and enhance learning interest

So far, the teaching of professional courses is mainly taught by teachers in class, assisted by teaching videos and other ways. However, for some courses that require spatial imagination ability, for example, in the course of building architecture, although the students watched the construction video, they still could not distinguish the structures such as flood water and drip water, and the platform beam and slope beam of stairs. The application of modern information technology makes it possible to diversify and activate teaching methods. Online education, virtual laboratory, case teaching and other ways can be adopted to enhance students' learning enthusiasm and participation. For example, building models are constructed by BIM modeling software such as revit, and intuitive three-dimensional models are demonstrated in class, so that students can personally know the shape, position and size of building components, as shown in Figure 2. The roaming function of modeling software can also be used to make students just like shuttling inside the building, which can further stimulate students' love for courses and majors.



Figure 2. BIM building 3D model

In the teaching process, based on the characteristics that students are accustomed to using various new media to receive knowledge, various learning software is used to subdivide the knowledge points of the course, and then assign a knowledge point to each student, and ask him to make the content of this knowledge point into a small video that is easier for students to understand by searching for materials. In this way, students' self-study ability, literature research ability and modern information technology application ability are exercised.

In terms of classroom teaching, to arouse students' interest in learning, students must be given something to do. Therefore, students should preview the knowledge points of a chapter before teaching, and then discuss in class through a group if they do not understand them. Finally, the teacher will explain the problems that cannot be solved.

3.3. Strengthen the practice link and set up perfect teaching facilities

Engineering management is a cross-disciplinary subject with distinct application, which requires students to understand both technology and management. Therefore, the advanced nature of teaching facilities determines the degree of students' professionalism. It is necessary to establish teaching classrooms for engineering management majors equipped with multimedia teaching equipment, install AutoCAD, Revit, Glodon BIM engineering cost software, BIM construction software, BIM5D management system, project management schedule network planning software, engineering bidding document compilation software and virtual simulation software training system, etc. It can realize engineering software teaching and solve students' learning problems.

3.4. Improve the course evaluation mechanism and establish the course evaluation model of engineering management

After optimizing teaching based on modern information technology, it is necessary to establish a sound course evaluation mechanism, timely understand students' feedback and opinions on curriculum reform, adjust and optimize teaching content and methods, so as to achieve better teaching effect. Fuzzy comprehensive evaluation method can be used to construct the evaluation model of engineering management curriculum. Specific steps include:

1. Determine the evaluation index system: According to the teaching objectives and contents of engineering management courses, determine the corresponding evaluation index system. The index system should be operable, objective and scientific.

2. Data collection: Data related to evaluation indicators can be collected by means of questionnaire survey, student performance record and teacher self-evaluation to obtain more comprehensive data information.

3. Construction of fuzzy hierarchy: The selected evaluation indicators are divided into several levels to build a fuzzy hierarchy model. Fuzzy hierarchy refers to the hierarchy composed of multiple evaluation indexes according to different dependence relationships. Each layer has multiple indexes, and there is a certain degree of fuzziness among them.

4. Determine weight distribution: Determine the weight distribution of different evaluation indicators in the whole evaluation system through analytic hierarchy process or other methods.

5. Fuzzy comprehensive evaluation: The fuzzy mathematics theory is used to process the collected data, calculate the fuzzy value of each evaluation index, and then carry out weighted calculation according to the weight distribution results to obtain the overall evaluation value of engineering management courses.

6. Result analysis and optimization: Analyze the results of the model, find out the indicators and problems with low evaluation value, and make corresponding optimization and improvement, so as to improve the quality and level of engineering management courses.

4. Conclusion

The knowledge and skills involved in the teaching of engineering management are relatively comprehensive and complex, so there are some teaching difficulties. Modern information technology is an important engine for the development of today's society, and the engineering management courses related to this need to be constantly updated and reformed to adapt to the needs and development of The Times. This paper combines modern information technology to reform and design the teaching content, teaching method and teaching practice of engineering management specialty, and puts forward the course evaluation mechanism based on fuzzy comprehensive evaluation method. It is suggested that the teaching difficulties of engineering management major can be solved by improving teachers' quality, renewing teaching contents and methods, strengthening practice and evaluation mechanism. At the same

time, it is necessary to pay attention to the cooperation with enterprises, combine teaching with practical engineering management, so as to realize the organic integration of theory and practice, improve students' comprehensive quality and employment competitiveness.

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