

Reform of Teaching “Building Materials” Course Based on the “Internet +” Concept

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Abstract. With the development of Internet technology, the teaching model based on the “Internet +” concept has gradually been applied. Making full use of the advantages of Internet teaching will fundamentally solve the problems existing in the current teaching of “Building Materials” and provide a new development path for the future teaching of “Building Materials”.

The advent of the Internet era has brought tremendous opportunities for the educational reform of university courses. In the era of the Internet, the benefits of sharing educational resources, expanding the scale of education, and improving the speed of education can be realized. Therefore, the “Internet +” teaching model will become an important trend in the reform and development of education.

Problems in the Teaching of “Building Materials” Course

“Building Materials” is a basic course in the training program for construction engineering professionals. It consists of theoretical and experimental courses. The purpose of this course is to enable students to master a variety of commonly used building materials, including the basic properties of the materials, production processes, uses, etc., mastering and hands-on ability to conduct experimental operations on the technical properties of materials.

However, the content of “Building Materials” is rather boring. The traditional teaching mode is often difficult to mobilize students' enthusiasm for learning. The teaching effect is not obvious. Teachers often feel powerless in the course teaching.

There are few links between the various types of building materials involved in the “Building Materials” course, and the contents of each chapter are relatively independent. There are many learning concepts, and students are prone to learning fatigue. For the reasons of class time, the experimental courses that students are interested in can only be selected in a small part. Take the City College of Wuhan University of Science and Technology as an example. The building materials experiment class is arranged as shown in Table 1.

Table 1 Class Schedule of “Building Materials” Experiment Class

No.	Experiment Contents	Teaching Hours
1	Sand and stone screening, water content experiment	1
2	Mortar consistency experiment	1
3	Mortar test block bending and compression test	1
4	New version of concrete and workability experiment	1
5	Concrete compressive strength test	1
6	Asphalt ductility measurement, penetration test	1

At present, the material industry is developing rapidly, and the building materials industry is also developing by leaps and bounds. New products and new technologies are constantly innovating, and students need to know more. However, the course has limited hours and it is impossible to teach the development of these cutting-edge industries in a comprehensive manner.

Therefore, in order to allow students to better understand the industry dynamics in a limited number of hours, and to learn this course better and more actively, it is necessary to reform the traditional teaching mode.

Characteristics of “Internet +” Teaching Mode

Because the traditional teaching mode cannot meet the teaching needs of the “Building Materials” course, in order to meet the needs of the current society for the cultivation of talents in colleges and universities, it is imperative to apply a new teaching model to the teaching of “Building Materials”.

The concept of “Internet +” can make full use of Internet resources and has made up for the shortcomings of the existing teaching model. The teaching model based on the “Internet +” concept refers to the teaching method of teachers and students using computers and networks to conduct cross-regional and inter-temporal teaching on the Internet. Compared with the traditional teaching methods, the teaching mode based on the “Internet +” concept has unique advantages, mainly in the following aspects:

(1) Sharing of teaching resources. In the traditional teaching methods, the carrier of teaching content is mainly textbooks, and it is also the basic tool for teachers' teaching. In the teaching mode of using the Internet, the teaching carrier is not limited to the textbook, and the carrier of the teaching content may also be the network. The use of powerful network functions can realize the sharing of teaching resources, and the teaching content is rich, which provides a great choice for learners, opens up the horizons of learners, and is more conducive to talent training.

(2) Flexible teaching methods. The traditional teaching model is limited by time and geography and can only be taught in a fixed classroom. Then, through online teaching, you can flexibly control the time, and you can teach at any time and any place. Students can also arrange time learning according to their own situation, which is flexible and convenient.

(3) Good interaction. In the traditional classrooms where teachers teach, because of the limited time, the communication between teachers and students is limited. In the network teaching, various Internet tools have been used to realize various interactions and interactions. Students can leave messages and ask questions to teachers in real time. Such a good way of interaction can not only evaluate students' learning in a timely manner, but also make the learning style more lively and lively.

(4) Timely update of teaching contents. Modern science and technology are developing rapidly, especially in the building materials industry. The new materials are gradually replacing traditional materials. Therefore, the teaching of the course should keep up with the pace of time, and the teaching content needs to be updated in time. The teaching model based on “Internet +” can make full use of the educational resources on the Internet, so that the teaching content can keep pace with the times. The teaching content on the network can be updated and supplemented according to the development of science and technology, and timely reflect the latest scientific research results, so that students can understand the most advanced building materials industry.

(5) Realized individualized services with students as the center. An important task of modern education is to focus on cultivating students' personal interests and let students actively explore, seek knowledge, and practice. In the teaching mode of the Internet, students change from passive listening to active participation, which enhances students' initiative and can effectively stimulate students' interest in seeking knowledge.

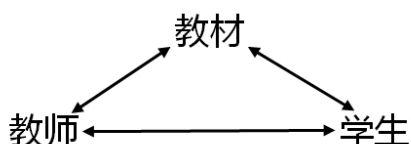


Fig. 1 Traditional Teaching Mode
教师: Teachers 教材: Textbook 学生: Students

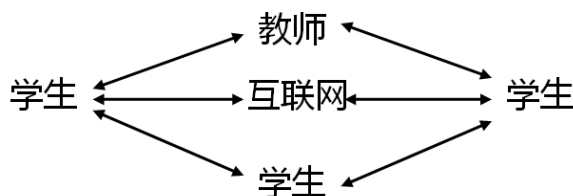


Fig. 2 Internet Teaching Mode
学生: Students 教师: Teachers 互联网: Internet

Thoughts to Reform the Teaching of “Internet +” “Building Materials” Course

Based on the “Internet +” concept of “Building Materials” course teaching, the network technology and curriculum teaching are organically integrated to provide a lively, graphic and literary environment. This can help achieve better interactive effects, greatly improve the teaching effect, and concrete and visualize complex and boring building materials. The reform of teaching the “Building Materials” course based on “Internet +” can start from the following aspects.

(1) Interactive courseware teaching. With the Internet technology used, store some courseware can be used for building materials courses on the campus network. The interactive courseware is not limited to PPT and other modes, but also can make some animations. The animation demonstration can further deepen the impression and improve the teaching effect.

The teaching mode of interactive courseware is very beneficial for the teaching of building materials experiment class. The building materials experiment class mainly includes the tensile and bending properties of steel bars, cement test blocks, concrete aggregate grading, mortar and asphalt. There are many experimental contents. If you only use limited classroom time to teach, you can only select three or four of them. The interactive courseware teaching mode can upload the courseware to the campus network in advance for students to study. This enables students to save time before experimenting, and also encourages students to take the initiative to carefully prepare before class, thus improving the quality of the experimental class teaching.

Table 2 The Content of Interactive Materials Learning Materials for Building Materials Experiment

No.	Experiment Item	Experiment Content
1	Cement	Fineness, density, standard consistency water consumption (standard method and substitution method), setting time, stability (standard method and substitution method), mortar strength (forming, compressive strength, flexural strength)
2	Sand	Loose bulk density, close bulk density, apparent density, sieving
3	Stone	Loose bulk density, close bulk density, apparent density, sieving
4	Concrete	Mixing, consistency, stratification, apparent density, strength test piece forming, compressive strength
5	Mortar	Mixing, consistency, stratification, apparent density, strength test piece forming, compressive strength
6	Wall	Material red brick compressive strength (including sample preparation), lime sand brick flexural strength, lime sand brick compressive strength, aerated concrete apparent density, aerated concrete compressive strength
7	Steel	Steel bar stretching, steel bar cold bending
8	Asphalt	Penetration, ductility, softening point

(2) Interactive online teaching. Through the network, students and teachers break through the limitations of time and space, which allows students to grasp the rhythm of learning according to their own situation and freely allocate learning time. For difficult problems, students can spend more time and no longer need to follow the teaching progress of the whole class.

(3) Real-time interactive communication. Through the Internet technology, if students encounter difficulties in their studies, they can directly seek guidance from teachers through the Internet, without geographical restrictions, and participate in discussions in real time to solve difficult problems. This enables real-time interaction between teachers and students and real-time interaction between students and students.

Prospect for the Teaching of “Internet +” Course

In the 21st century, the Internet is an important material basis for an information society. In order to cultivate high-quality comprehensive talents and enable students to better adapt to the rhythm of social development, it is imperative to apply Internet technology in the teaching of Building Materials. The “Internet +” course teaching mode can better stimulate students’ desire for

knowledge, understand new developments in the industry, and speed up learning. This can give full play to the advantages of the Internet, achieve organic integration with traditional teaching models, and fully combine theory with practice. This will enable students to have both the systematic knowledge of the “Building Materials” course and the cutting-edge requirements of the building materials industry, and become a practical and applied talent.

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