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Teaching Reform and Practice of "Municipal Road Construction" Course Based on Information Technology

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Abstract: With the rapid development of science and technology, the cost of using information technology and the Internet is getting lower and lower, so the Internet has gradually entered thousands of households. The advantages of the Internet in education and teaching are gradually explored by educators. The use of information technology to carry out teaching this new teaching method is gradually popularized. The rich teaching resources on the network in the classroom fully mobilize the students' interest in learning, so the classroom teaching effect has been significantly improved. Taking the "Municipal Road Construction" course as an example, this paper briefly expounds the concept of information technology and its role in municipal road construction and the necessity of information technology reform in this course, and puts forward some teaching reform measures according to the current education and teaching status, to provide support for the teachers of "Municipal Road Construction" course in colleges and universities.

Keywords: Information technology; Course of "Municipal Road Construction"; Teaching reform; practice

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1. Introduction

In the new era, the Internet and information technology have become part of people's daily lives, and its impact on the education industry is obvious to all. The supplement of teaching content, the mining of teaching cases, and the improvement of education quality cannot be separated from the help of the Internet and information technology [1]. The application of information technology in the course of "Municipal Road Construction" cannot only enrich the teaching content, provide teaching cases that meet the teaching needs of the new era, improve teaching efficiency, but also improve students' learning enthusiasm and subjective initiative, transform abstract knowledge into easy to understand, thus playing a role of edutainment and promoting students' mastery of knowledge. Thus, the construction of an efficient classroom can be realized.

2. Information technology overview

2.1. Information technology

Information technology is a comprehensive technical system of processing, storage, transmission, and application of information. With computer hardware and software as the core, it realizes global information sharing and instant exchange through the bridge role of network technology. Information technology not only includes personal computers, servers, storage devices, and all kinds of network infrastructure but also covers operating systems, application software, database management systems, and other software. In addition, the use of information technology can quickly transfer a lot of information, from the jumbled information flow to extract valuable information is also a part of information technology, such as cloud computing, big data, the Internet of Things, and so on [2].

2.2. The application advantages of information technology in the management of municipal road construction site

In addition to facing the complex environment such as natural conditions, traffic planning, and people's production and life, municipal road construction also needs to make emergency plans for location emergencies. The management difficulty of construction sites rises sharply compared with classroom simulation. In the process of construction, information technology can be used to accurately collect construction data in real time, extract valuable information through information storage, transmission, processing, feedback, and other steps to analyze factors affecting construction, and extract information conducive to site construction management and control, to provide data basis for construction design, resource division, schedule control, scientific, safe and effective implementation of high-quality construction site management [3]. For example, in the process of municipal road construction, China's Beidou satellite navigation system can be used to obtain the overlooking map and three-dimensional spatial data of the construction site, establish the site control network, and use the information extracted from the information technology equipment to simulate the 3D three-dimensional simulation geological model, to provide clear environmental and spatial data for the road construction, and to provide information data support for the construction [4]. To properly handle these data, the construction party can use information technology, with the help of the huge capacity of cloud storage, optimize the data resource structure, all charts, audio, and video materials are included in the management scope, and build a database management system, to realize the efficient management of structured data and unstructured data, and can ensure the safety of data by setting access rights [5].

3. The status of the curriculum and the necessity of teaching reform

The course "Municipal Road Construction" occupies an important position in the major of municipal engineering technology. It is a key course to cultivate the comprehensive ability of road engineering construction and quality inspection. It covers roads, bridges, water treatment, pipelines, and other directions, and directly corresponds to the positions of municipal engineering construction worker, quality officer, supervisor, cost officer, and so on. The target units include construction units, design units, supervision units, testing units, cost consulting units, and so on. Through the study of this course, students can master the basic principles, technology, and management methods of municipal road construction, and have the ability to solve practical engineering problems. However, due to the lack of practical training equipment and venues for this course in most colleges and universities, it is impossible to carry out practical teaching of construction courses smoothly. The main content of the "Municipal

Road Construction Technology" course is closely related to the construction line, covering roadbed renovation, base construction, surface laying, asphalt and cement road surface construction methods, and many other aspects. These construction links are highly technical, complicated processes, some projects are more hidden, and the construction is particularly difficult under certain geological conditions. The knowledge points and data of the course are detailed and complicated, which deeply integrates several construction technical standards and industry norms [6]. In addition, there are some abstract and difficult parts in the technical theories, which make it difficult for students to learn, and it is difficult to achieve the preset teaching objectives by relying only on traditional classroom teaching.

Therefore, the course "Municipal Road Construction" is in urgent need of introducing information technology to carry out teaching reform and create a higher quality classroom for students. Given the above characteristics of the course, if only the traditional "cramming" classroom teaching method, not only seems abstract and boring but also difficult to stimulate students' interest in learning. The use of modern information technology teaching means through information teaching can be complicated technical points in the course into specific, three-dimensional, visible content, to greatly stimulate students' enthusiasm for learning. This kind of student-centered information teaching method can make students understand abstract knowledge more clearly from their point of view, and significantly improve the teaching efficiency and effect.

4. The teaching reform of "Municipal Road Construction" course in colleges and universities

With the continuous advancement of various education and teaching reforms in recent years, the effect of applying information technology in education and teaching is obvious to all, and the reform of education and teaching information technology is also in full swing. "Information-based teaching mode" mainly refers to the use of information technology means, according to the specific learning characteristics of students to implement personalized teaching guidance, effectively supplement the traditional teaching mode of rigidity and boring defects. However, some teachers do not really understand and master the method of information-based teaching, do not fully perceive the help of information technology for the teaching of the "Municipal Road Construction" course, and still adopt the traditional teaching method. Even though some teachers use multimedia and other information technology equipment, they only use multimedia as a tool to display teaching materials and theoretical texts and do not make full use of the advantages of information technology structure theory, simplifying complexity, and transforming abstraction into concrete [7]. In addition, even though some teachers realize that information technology can expand the teaching resources of the course, due to the imperfect Internet information technology platform, the teaching expansion content of the course "Municipal Road Construction" on the network is very little, and the role of information technology in transmitting information cannot be fully played.

5. The teaching reform and practice of "Municipal Road Construction" course based on information technology

5.1. Break the shackles of traditional education

Traditional classroom teaching is teacher-centered. Teachers speak "stand-up comedy" on the platform, students take notes passively and mechanically under the platform, and knowledge is conveyed to students in the way

of “indoctrination” and “stuffing”, which deepens the sense of distance between teachers and students, fails to fully guarantee students’ main position in the learning process, and is not conducive to students’ independent learning activities. Only by breaking the traditional teaching mode of “one word” can the information teaching reform of the “Municipal Road Construction” course be carried out smoothly. College teachers should start from themselves, implement the concept of “people-oriented”, truly build a “student-centered” classroom, break the shackles of traditional teaching mode, actively communicate with students, deeply understand the characteristics of students, interests, and hobbies, and use information technology to combine students’ interests with teaching content to carry out teaching activities. Fully attract students to participate in the classroom interaction, encourage students to put forward their own opinions on knowledge points, teachers according to the opinions of students in time to evaluate, and build a good atmosphere for classroom communication, so that students can speak freely from their hearts [8]. Under the teaching mode of using information technology, students’ subjective initiative of learning is fully mobilized, and students can have a deeper understanding and more firm grasp of relevant knowledge of municipal road construction in a relaxed and pleasant teaching atmosphere. Moreover, they can also realize their deviations in understanding of knowledge in the interaction with teachers and classmates, to correct them in time. This can lay the knowledge foundation for the subsequent study of municipal road construction courses.

5.2. Visualize relevant knowledge points

The knowledge points of the course “Municipal Road Construction” are characterized by the fact that the construction is greatly affected by natural conditions, the professional cooperation in the construction area is abundant, the construction projects are diverse, the construction methods and procedures are standardized, and the quality control is difficult, etc., which has a strong abstractness in itself. Moreover, due to the characteristics of the course, it is difficult to offer practical training courses of this course in colleges and universities. It is difficult for students to fully understand it only by the text description and legend in the textbook, and it is complicated to learn. The knowledge that is too difficult to understand will affect the construction of students’ self-confidence, make students lose their enthusiasm for learning, and even appear tired of learning. To avoid such a situation, the teachers of the course “Municipal Road Construction” in colleges and universities should make full use of information technology, flash animation, PPT, video micro-lessons, and other forms to make the difficult knowledge into video animation, disassemble the principle so that students can understand the knowledge more easily [9–10]. For example, when learning the road construction process, teachers can disassemble and refine the construction process in the form of multimedia video playback, so that students can more easily understand the relevant knowledge of the road construction process, to improve the teaching efficiency of the class.

5.3. Mobilize students’ enthusiasm for learning

College students are in an important period of the formation of knowledge systems. They have a strong curiosity for unknown things and a strong desire to explore new knowledge. In the process of information reform of the course “Municipal Road Construction”, teachers can first use the cases that students are interested in and easy to understand to introduce the class content and arouse their interest in learning. The knowledge of road construction is abstract and difficult to understand, and it will inevitably seem boring and monotonous in the learning process. Therefore, the primary task of teachers is to stimulate students’ learning initiative, so that they can experience the fun of road construction knowledge, gradually eliminate their weariness of learning, and

encourage them to actively participate in classroom communication and interaction [11]. With the background of information technology changing rapidly, it is particularly important to use information technology to improve teaching and enhance students' learning enthusiasm.

5.4. Broaden students' horizons of knowledge

The teaching materials used in traditional classroom teaching often have a lag, and the teaching content is no longer applicable to the current practical construction situation under the rapid development of science and technology and society [12]. The limitation of old teaching materials and teaching content limits the height and depth of students' learning, which is not conducive to students' broadening their horizons, and it is difficult for the teaching effect to achieve the expected teaching goals. Therefore, teachers can use information technology and the Internet to search for new teaching materials for students, lead students to understand the academic frontier content and broaden the scope of students' knowledge, so that students can stand on the shoulders of "giants" to learn and think, enrich the classroom content, and make up for the limitations and lag of teaching materials. For example, when learning the process and steps of municipal road construction, teachers can encourage students to use the Internet to collect information about various construction schemes. On the online platform, students can not only have access to a wealth of road construction-related materials but also broaden their knowledge field [13]. By using information technology, students can not only grasp the knowledge points in the textbooks but also learn extracurricular knowledge, which can provide help for their follow-up study.

5.5. Improve students' comprehensive ability

With the continuous deepening and development of the new curriculum reform, in daily teaching, college teachers should not only impart theoretical knowledge to students and exercise practical ability but also focus on improving students' comprehensive ability and quality level. In the process of municipal road construction, the geological environment of the construction site, the impact of the weather on the construction, the impact of the construction on the appearance of the city, and the materials selected in the construction process and whether the materials have pollution to the environment are all issues that need to be taken into consideration by relevant staff. Therefore, for the course of "Municipal Road Construction", in addition to mastering the learning content required by the course, students also need to understand and master some interdisciplinary content, such as geographical knowledge, meteorology knowledge, municipal planning and design knowledge, and chemical materials and environmental protection knowledge [14–15]. College teachers should make full use of information technology to collect extracurricular knowledge and learning materials for students, cultivate students' interdisciplinary learning ability, expand students' knowledge breadth, guide them to identify potential risks in construction, seek timely solutions, and further strengthen the cultivation of students' comprehensive ability.

6. Conclusion

With the continuous progress in the field of education, curriculum reform has received increasing attention. For college students, the reform has brought great benefits and can best meet their learning needs. However, to ensure the maximum benefit of the teaching reform, the reform process needs to follow the established principles, especially in today's rapid development of information technology. Only by adopting the most appropriate teaching methods can teachers promote the improvement of students' abilities and ensure the smooth progress of the teaching reform of the municipal road construction course.

Disclosure statement

The author declares no conflict of interest.

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