Research on Educational Technology System Based on Multimedia and Computer Aided Design

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Abstract. With the rapid development of computer technology, multimedia computer-assisted teaching has attracted more and more attention from people, and it has also begun to be applied to the teaching of educational technology system. Educational technology based on computer-based aids not only enables students to master advanced knowledge, but also contributes to the development of students' overall quality. It can inspire students to pursue advanced science and technology, inspire students' sense of innovation, and promote students' active learning of new knowledge., to cultivate students' self-learning ability and to exercise students' practical skills. Multimedia and Computer is a strategic task in the teaching reform of colleges and universities. It is also one of the important symbols of improving teaching quality.

1. Introduction

Although the establishment of the educational technology major in China has only a short period of time of more than ten years, it has achieved fruitful results. It has formed specialties, undergraduates, masters, and doctorates, and from normal teachers to non-teachers, from ordinary full-time. From education to higher education self-study exams, part-time colleges and universities, from face-to-face education to distance education, etc. [1]. In recent years, in addition to teacher colleges, many comprehensive universities and colleges of science and technology have also the education technology majors were established one after another. With the in-depth development of education information, more education technology majors will be born. In order to make the profession develop healthily and cultivate professionals who meet the needs of the society, the use of multimedia and computer-aided design methods to scientifically design the education technology major has reached the utmost urgency [2].

2. The Significance of Good Education Technology

In the information age where computer network technology is increasingly evolving, students of educational technology want to develop better in their jobs. They must have a strong combination of theory and technology. The needs of society determine the discipline's professional curriculum system. However, it is also found in the survey of graduates of educational technology that the multimedia technology education that they received in college and undergraduate courses is out of touch with their work needs, leading to some problems [3]. This article through the specific analysis of the teaching materials selected by the multimedia technology curriculum of China's educational technology, found that most of the teaching materials do not meet the professional characteristics of educational technology. This may be the key reason leading to the disconnection between the technical quality of multimedia education and practical work requirements [4].

3. Developing New Ideas for Systematic Research on Educational Technology

The system of educational technology is developed with the application of modern information technology in the fields of education and teaching. It is designed to meet the needs of education, diversification, personalization [5], and internationalization. Multimedia technology and computer

networks have seen rapid development. The popularization of multimedia computers, especially the construction and introduction of the campus network and the Internet, has changed the teaching environment, enriched the teaching resources, greatly promoted the development of educational technology, and will fundamentally change the concepts that have long been formed in educational technology [6]. Ideas and systems: In theory, the theories and methods based on "learning" of instructional design, led by constructivist learning theory, will be gradually formed; in practice, a new type of learning will be formed combining various media with a network as the center.

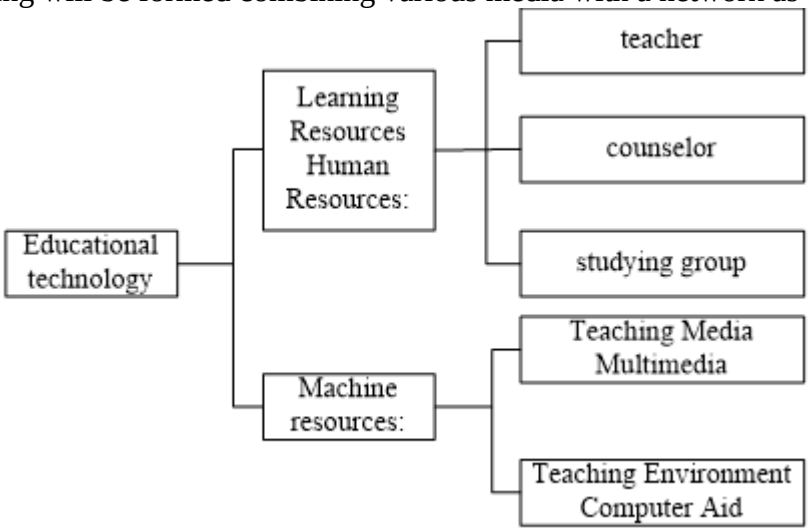

Fig. 1. Educational technology of multimedia and computer aided design

3.1 Re-Defining the Content System of Teaching Materials

When professional education technology professionals are engaged in multimedia technology, most of them are the assembly and maintenance of multimedia equipment, multimedia product design and development, and many of these are used for education and teaching, so while mastering technical knowledge, It is also very important to join the idea of education and teaching [7].

(1) The Basic Knowledge of Multimedia Technology.

Briefly introduce the basic knowledge of multimedia. Including the concept of multimedia and development and application, the basic overview of educational media theory (psychology, pedagogy, communication, etc.), as well as the introduction of multimedia technology. Among them, the theoretical basis of educational media should be a manifestation of the characteristics of educational technology and strive to enable learners to accumulate the theoretical basis of education before mastering multimedia technology knowledge. In addition, the introductory knowledge of multimedia technology should be based on actual needs to avoid the strong technical and professional language of computer series professional books [8].

Second, the main content and development trend of multimedia technology research in the field of education technology. The application of multimedia technology in the field of education can be said to be part of the multimedia technology that educational technology researchers are concerned about. The three levels are subdivided here, and the application characteristics of multimedia technology in the field of education, especially in the field of education technology, are described in detail from the perspective of technology, education application, and art presentation. As a focus, this part should not only include the introduction and explanation of technology, but also include the process and principles to produce multimedia courseware and accumulative parts, as well as the introduction of art. It should be said that this is the most practical part of educational technology researchers.

(2) Multimedia Hardware Platform Technology.

It should be based on the introduction of everyday applications of multimedia equipment, coupled with the introduction of multimedia teaching computer projection equipment, so that readers quickly master the use of multimedia teaching machine skills. The hardware part should include the introduction, assembly and maintenance of multimedia equipment. The purpose of this chapter is to enable students to understand the features and functions of multimedia hardware devices and to

master simple and practical assembly and maintenance techniques. As for the working principle of the equipment, some of the knowledge that does not have much to do with practical application may not need to elaborate. If there is more content about the principle, the designed teaching material becomes a tutorial for computer students. Multimedia processing software. Sound, image, animation, video and other processing software, mainly introduced software.

(3) Educational Performance Level.

Educational technicians use multimedia technology to develop and design education and teaching products. Understanding and making flexible use of multimedia production software is the focus of teaching goals. 1 courseware technology. Introduce courseware production and development process, using PowerPoint and Author ware as examples. 2 pieces of technology. Introduce the concept of integrator and the process of developing integrator. For details, please refer to "From Courseware to Integral: A New Discovery of Computer Aided Instruction in School Classes in China".

(4) Set Up Comprehensive Courses in the New Curriculum System.

Integrate related teaching content and set up a new comprehensive curriculum. For example, the audiovisual media and teaching curriculum includes relevant contents of the optical projection media and teaching in the original course system, electro-acoustic media and teaching, educational television systems, educational electro-acoustic systems, and television teaching materials, and they are integrated and improved. Make it a brand-new new course on the theory and practice of teaching media; the multimedia computer system principle course includes multimedia computer, principle of microcomputer assembly, assembly language, micro-computer interface technology, etc.; educational technology equipment maintenance course includes electricity Sound equipment circuit analysis, TV circuit analysis, video camera circuit analysis, computer troubleshooting, etc.

The establishment of a comprehensive course is not only conducive to the training of students' comprehensive abilities, but also saves teaching time, reduces the overlap and repetition of content, and lays the foundation for the establishment of a new course system.

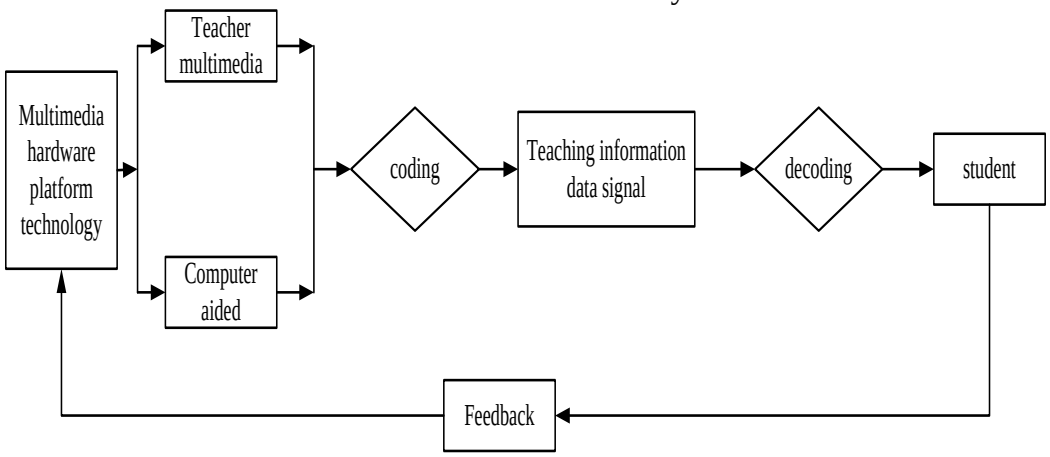

Fig. 2. Educational Technology System of Multimedia and Computer Aided Design

4. Implementation Method of Educational Technology for Media and Computer Aided Design

4.1 Classroom Teaching Methods

The multimedia courseware only involves one or two knowledge points. The larger multimedia courseware can involve many knowledge points, such as involving a teaching unit or even a course. For the use of multimedia courseware, if you want to achieve better results, that is, you want to achieve the goal of significantly improving the quality of teaching and the quality of students, the key is to grasp the following points:

(1) It is used to create situations. The role of creating situations is to create through real or similar situations, so that students have more profound feelings and experiences. There are two general situations in teaching that create situations: one at the beginning of a class, and the other at the middle

or end of a class. The application of these two situations does not have the same requirements for creating situations.

The creation of the situation in the head of the class is to stimulate students' interest in learning and focus the students' attention about this lesson; the creation of the situation in class or at the end of the lesson is used to promote students' knowledge and concepts. Understanding, mastering, or used to consolidate, deepen, and expand emotional teaching goals. There are many ways to create a situation: In addition to using multimedia courseware, you can also play a video recording, recite a poem, deliver a piece of music, tell a lively story, give a typical case, design a lively and interesting Role play .and so on. Of course, all these activities have a precondition they must be closely related to the current learning topic, otherwise they will not achieve the purpose of creating a situation.

It is used to break through key difficulties - the abstract concepts, principles, rules in science and engineering, pathological analysis and surgical procedures in medicine, and some important theoretical viewpoints in the humanities. It is often difficult to pass only teachers' dictation and writing. To meet the requirements of teaching objectives; In addition, some of the dangerous experimental experiments in chemical experiments, the actual operation process is not easy to explain clearly and inconvenient to demonstrate, for these teaching the key and difficult points, such as the appropriate use of multimedia courseware, usually Can achieve satisfactory teaching results.

For the promotion of autonomous learning - There is a large class of multimedia courseware (such as courseware with 3D animation capabilities, interactive courseware, courseware for experimental simulation, mathematical modeling software, and content-rich literature or tape The video and audio case courseware) can be used not only as visual aids for teaching by assistant teachers, but also as a cognitive tool for promoting students' independent learning and independent inquiry (on the basis of independent learning and independent inquiry, if we can further organize the whole class Or the team's cooperation and exchange will achieve a more ideal teaching effect.)

It should be noted here that for science and liberal arts subjects of two different natures, the types and nature of courseware that can function as cognitive tools are very different: Science cognitive tools generally use three-dimensional animation courseware, Interactive courseware, experimental simulation courseware, and mathematical modeling software are the main tools. Liberal arts cognitive tools are generally based on rich literature materials or case-based courseware with video and audio (this is also the integration of information technology and subject teaching. Science teachers generally report that the main reason why they are more difficult than liberal arts teachers is that the liberal arts cognitive tools are easy to search and download from the Internet, and that science cognitive tools often require teachers to develop them.

(2) The multimedia courseware design should combine the characteristics of different disciplines to make the most effective use of multimedia graphics, text, and sound features to achieve the best teaching results. In general, the abstract concepts and basic principles of engineering and engineering, and the operation procedures and operation methods of engineering subjects are most effective for 3D animation (such as semiconductor PN junction principle, mechanism of various chemical reactions, spread spectrum principle in mobile communication, and transit Switching process, IP address and physical address conversion in computer network, building construction methods, etc. use 3D animation to demonstrate, or allow students to use 3D animation to explore independently, can achieve more ideal results); in some special circumstances Under (for example, want to understand the internal microstructure of the material), you can also use "virtual reality" technology to allow students to observe, feel, and experience immersionist to gain a deeper understanding. For a variety of medical procedures and pathological analysis (such as tumor metastasis, how white blood cells are deformed, etc.), real dynamic video recording can often achieve the best teaching results.

Many theoretical perspectives of the humanities are based on a large amount of data and examples. This requires the use of rich literature, charts, photographs, and related video material (whereas 3D animation is often not used in this context). For the art disciplines (such as music, painting) multimedia sound and color can undoubtedly play an important role.

(3) Multimedia courseware design should mobilize students' initiative and enthusiasm Do not regard multimedia courseware as visual teaching aids for teachers to demonstrate, but also regard

multimedia courseware as a cognitive tool and collaborative communication for students' independent learning and self-inquiry. tool. In other words, not only the multimedia courseware should be used as CAI but also as CAL; the current situation is that the majority of teachers are accustomed to the former application model (CAI) and not familiar with the latter application model (CAL). This situation should change as soon as possible.

(4) The contents of the multimedia courseware should be correct, vivid, vivid, and rich in multimedia courseware content involving animation, photos, graphics, sound and video all these content must first meet the correctness requirements, that is to ensure that there is no scientific and political errors; Under this premise, it is also necessary to meet the requirements of the image, liveliness and richness (the content cannot be too single, the relevant information cannot be too poor).

5. Information Technology Applied to Teaching - Online Course

The curriculum refers to all the teaching content and teaching arrangements needed to achieve a certain teaching goal.

Teaching content mainly refers to teaching materials (text materials or electronic teaching materials) and related teaching resources. Teaching arrangements usually include lectures, self-study, experiments, tutorials, Q&A, assignments, exams, and more. Web-based courses refer to Web-based courses under the guidance of advanced educational ideas, teaching theories, and learning theories. Their learning processes are interactive, shared, open, collaborative, and autonomous.

It should be noted that since the teaching content contains teaching resources, online courses should usually include teaching resources (as well as academic resource websites). Online courses that involve only the teaching materials themselves are not real (at least incomplete) online courses. However, in the actual development process, in order to facilitate work (such as the need for division of labor or parallel development), teaching resources are sometimes separated and even It is tied to web courses - called "web curriculum and web resource development." At this time, special attention should be paid to the fact that this distinction is only the need for division of labor in the development process, and the online course is originally supposed to include network resources (and disciplinary resource websites) in the interactivity of the web course, which generally includes human-computer interaction and teacher-student interaction. Interaction between students and students. Human-computer interaction requires students to make full use of the network environment to study independently, self-exploration, and self-test; teacher-student interaction requires teachers and students to have online interaction (such as online counseling, Q&A, discussion, discussion); student interaction requires individual students, or There should be online discussions and collaborations within the group and within the class. The sharing of online courses requires the support of a wealth of relevant teaching resources. Therefore, it is generally believed that "without rich teaching resources and strong interactivity, there will be no real online courses."

5.1 Teaching Methods of Media and Computer Aided Design

Allow students to fully and correctly understand and understand the learning process and learning resources. A. The learning process is a cognitive process in which learners learn new knowledge and master new skills.

The students of educational technology majors are future instructional designers, future software makers, future teachers, and future more general “educators”. Their understanding and understanding of the teaching process and student learning process will affect the software they design and produce in the future, determine their future teaching methods, and determine their understanding and perspectives as educators and education. Students should be taught that the modern teaching process is a process in which students take the initiative to acquire and process knowledge. Teachers are the helpers and mentors of students' learning. They are not the indoctrinates of the teaching process and knowledge. The modern teaching process should be A “student-centered teaching model under the guidance of teacher’s Modern instructional design is increasingly focusing on the design, development, utilization, management, and evaluation of the teaching environment. Commonly used teaching models in the teaching process are: multimedia combination of classroom teaching models.

The classroom teaching mode of multimedia computer aided teaching, the individualized teaching mode of multimedia computer, the long-distance teaching mode of two-way broadcasting television system, the network teaching mode of INTERNET and the virtual reality teaching mode of computer simulation technology, etc. With modern education theory, With the continuous development of learning theory and modern information technology, it is necessary to continuously explore new teaching modes that can optimize the teaching process.

6. Conclusion

Information technology marked by multimedia and network communication can play a greater role in teaching. The effective use of information technology in teaching to achieve significant improvement in teaching quality and student quality must be integrated in the deep integration of information technology and curriculum. Under the guidance of the theory, under the research of scientific information technology and curriculum integration system, multimedia and computer-aided design education technology system can be effective.

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References

[1]. He Kekang, et al. Argumentation and Thinking on the Logical Starting Point of Educational Technology. Electrification Education Research, Vol. 3 (2008) No. 6, p. 123-127.

[2]. He Kekang, et al. Theories and methods of deep integration of information technology and curriculum. Electrification Education Research, Vol. 1 (2005) No. 7, p. 48-52.

[3]. Ren Jianfeng, Yang Xiaohong, et al. Investigation on Job Evaluation of Undergraduates Majoring in Educational Technology. Journal of Gansu Radio and TV University, Vol. 12 (2008) No. 14, p.14-18.

[4]. Yang Xiaohong, Liang Li, et al. On the reform of educational technology professional training objectives. Electrification Education Research, Vol. 8 (2015) No. 17, p. 321-325.

[5]. Yang Xiaohong, et al. The Construction of the Matrix Structure Course System in Normal Universities. Journal of Northwest Normal University. (Social Sciences Edition), Vol. 6 (2012) No. 12, p.72-75.

[6]. Yang Xiaohong, et al. Educational System Reform Program of Undergraduate Major Matrix Structure. Electrical Education Research, Vol. 9 (2013) No. 13, p.312-315

[7]. Li Kedong, et al. Development of Educational Technology and New Tasks of Audiovisual Education. Educational Technology and Educational Modernization. Vol. 8 (2012) No. 21, p.118-123.

[8]. He Kekang, et al. Research content of contemporary educational technology. China Electrification Education. Vol. 3 (1996) No. 11, p. 234-238.