

The Application of Hypermedia Instruction and Its Improvement

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Abstract The application of hypermedia instruction is getting mature, so the depth and breadth of teaching have been improved. In teaching, the application of hypermedia is mainly manifested by the following aspects: storing rich teaching resources, optimizing classroom teaching, achieving simulation teaching, conducting drills and practices, etc.. In learning, it is mainly shown as follows: to achieve resource-based learning, improving learning effectiveness and exploring diverse learning methods. In order to meet the growing demands of modern education, the application of hypermedia instruction is expected to improve in software, hardware, technology and so on.

Key words Hypermedia; Instruction; Improvement

1 Introduction

Hypermedia refers to organize and handle graphics, images, animation, sound, video and other multimedia information by means of hypertext. Hypermedia is an integration of many kinds of media message. Moreover, hypermedia is characteristic of novelty of information presentation. In hypermedia, information is divided into several small “information blocks” which are inter-related by chain to create, edit and link different pieces of information. Hypermedia enables learners to successfully integrate new knowledge into their original knowledge bases so that learners become decision makers in information processing. Since 1980s, based on the development of hypermedia learning environment, the students have enjoyed traveling in the ocean of information and the direct access to knowledge has become a reality.

2 Application of Hypermedia Technology in Teaching and Learning

2.1. Application of hypermedia technology in teaching

2.1.1 Storage-rich hypermedia teaching resources

A wealth of electronic lesson plans and courseware have been created in hypermedia teaching system. Hypermedia allows teachers to collect a great deal of information (in various forms of the vector), and it is stored in an extremely intensive form. Lively electronic materials, lesson plans and courseware are formed through hypermedia teaching network. These resources not only include text and graphics, but also present sound, animation, video and simulated three-dimensional scenes, and the graphics and images series are connected with each other through an invisible chain to form a complete resource system.

2.1.2 Optimizing classroom teaching

The optimization of classroom teaching of hypermedia is mainly embodied in the following aspects. First, hypermedia offers individual instruction. It can show students hypermedia electronic resources which are combined by maps, text, sound, image in the classroom according to the characteristics of students. Second, hypermedia offers different-step teaching. Hypermedia network can not only offers single feedback, but also communication with teachers, with any user in the net so as to achieve the objectives of teaching. Finally, hypermedia offers a collaborative approach to learning. The use of desktop systems and application functions, teachers can operate the system directly, students can see the process of problem-solving.

2.1.3 To achieve teaching simulation

The combination of computer and simulation technology has spread to all areas of teaching. By means of this technology over the media network, coupled with QuickDraw3D, Quick Time VR technologies, using 360-degree panoramic photography technology can generate high-quality images to capture realistic virtual scenarios. Students control experiment steps through operating the simulation system, and then go into the real laboratory, which provides students with a kind of environment of experience and observation so that students can observe and manipulate the object in it and get a real experience or make new discoveries. In addition, there is also a virtual classroom, in which asynchronous communication is used to develop teaching and learning activities.

2.2 Applications of hypermedia technology in learning

2.2.1 To achieve resource-based learning

Hypermedia is characteristic of high information content, many means of information presentation, nonlinear network structure and so on. It provides a learning environment with a wealth of educational resources and intelligence on the basis of rich information content, changeable form and dynamic chain so that learners can use the hypermedia system to obtain the knowledge they need for efficient learning. commonly available and inexpensive multimedia handheld devices, laptop, and desktop computers allow students and teachers to connect to this global hypermedia environment using wired and, increasingly, wireless networks, thus providing countless opportunities for access to educational hypermedia and information resources^[1]. Concurrently, the producers of the hypermedia can control the implicit chain to further support and deepen the content of the material. For example, lesson preparation in hypermedia long-distance teaching refers to all resources on the internet to design, copy, layout, process and forms the corresponding electronic lesson plans and courseware.

2.2.2 To improve the effectiveness of learning

The hypermedia system may decompose the knowledge system into the network structure system which constitutes by the node and the chain in order to reduce the learner's cognitive load. Hypermedia information retrieval and processing is a nonlinear, random, jumpy network. Hypermedia depicts "The relations among concepts" (Ayersman, 1993), Hypermedia "let the knowledge to adapt to people rather than people to adapt to the knowledge base" and "make knowledge more accessible to the individual cognitive structure" (Nelson & Palumbo, 1992). In this way, learners can choose to follow the locus of explicit chain characterized by clear marks. Hypermedia systems actually provide an effective method of information presentation so that students can construct knowledge from a number of angles to improve their efficiency of information transfer and the depth of understanding. In addition, the interactive nature of hypermedia promotes interaction mechanism for teachers and students, which is the center of efficient teaching implementation. By cognitive learning theory, human knowledge is generated by the interaction of external stimuli and internal mental processes, students must play an active role in the process to become the subject of cognition. In fact, hypermedia provide a self-controlled environment for the high-level learners, therefore, learners can choose their favorite and the most effective form to understand the meaning of the information, and thus stimulate students' interest and motivation, and give them the maximum degree of freedom.

2.2.3 To explore a variety of learning styles

Firstly, hypermedia encourages individualized active learning, which is a student-centered individualized learning. In this style, each student selects different levels of learning content according to their level, based on their mastery of knowledge, and personal interests, hobbies, experience and task demands, different learning approaches and learning progress to achieve the same learning objectives. But hypermedia enables the students to control the abilities of choosing their learning content, quantity, speed, path and presentation. Secondly, imitate study. By using hypermedia teaching, the students make imitate study, the teaching content is broadcasted to all the students through the hypermedia network, with detailed analysis and discussion the situation. Thirdly, structured discovery learning. Hypermedia can correlate the information with related information. In addition, all of the projects in it associate with both logic and the way of thinking of the human brain of intuition. Hypermedia system can establish the relationship links according to the relevance of knowledge through hypermedia system. Learners will focus on the relationship of the link structure and the relationship between knowledge^[2]. Fourthly, coordinate study. Making full use of hypermedia network can help collaborative learning, which can improve learning efficiency through interactive dialogues.

3 Improvement of the Use of Hypermedia Instruction

3.1 Software level: building a hypermedia teaching system

Hypermedia instruction breaks through the limitations of teaching resources and teachers' knowledge. It acquires information from the internet to learn a wealth of knowledge. In the hypermedia system, those activities, such as interactive interface, learner navigation, teacher activities, and individual or collective learning will be led to a straight influence on the result of hyper media instruction effectiveness. Hypermedia instruction system implements powerful functions, which has a strong teaching ability and real-time online demonstration effect via its specific instructional design. This teaching system can be shown with the following chart. And hypermedia teaching has the ability to raise its application value through a good instructional design. Some studies show that, when

hypermedia materials change into knowledge, they display two major features: First, at the teaching level, themes and concepts must conform to the experts' understanding. At the same time, they should reflect the importance for the students to learn them. Second, at the design level, hypermedia materials must be in conformity with the cognitive flexibility theory (Jacobson (1994). Cognitive flexibility refers to the variety of ways to reconstruct one's own knowledge to respond to the changed situations (Spiro, RJ & Jehng, J, 1990). Adopting different teaching methods and designing scientific hypermedia teaching system based on the teaching requirements aims at promoting knowledge exchange, promoting both teaching and learning, which can enhance the sense of teaching reality and the novelty of knowledge.

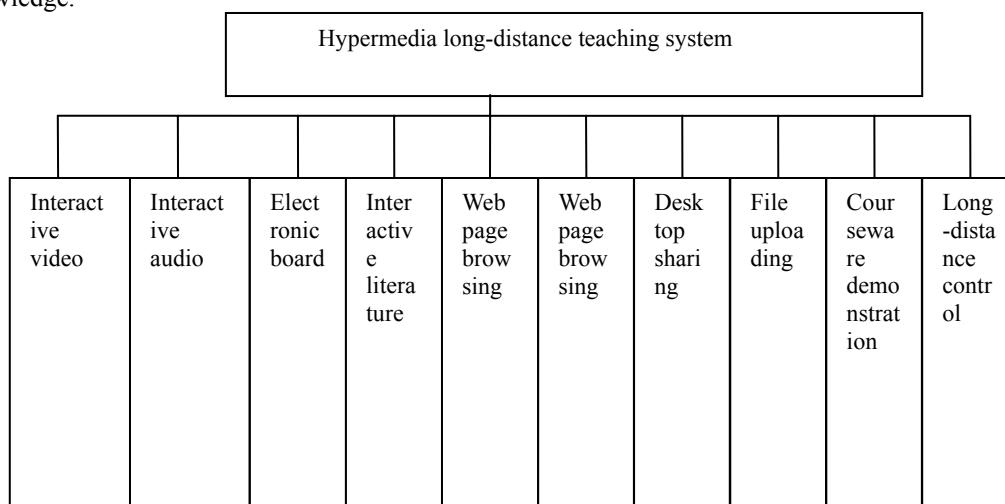


Figure 1 Hypermedia Long-distance Teaching System

3.2 Technical level: providing navigation strategy and structure interface

Navigation strategy is embodied in the teaching strategies. It is a selective learning strategy to avoid students deviating from a certain target, and to improve the learning efficiency. Search navigation includes search navigation, help navigation, navigation indexes, adjusting table navigation, presentation navigation and bookmark navigation. Search navigation can help learners read and extract pertinent associated nodes, allowing users to select the appropriate direction and goals of jump nodes. In this process, learners can choose appropriate learning content and learning strategies according to their interests and basis. They can jump from one topic to another topic, from a concept to a relevant demonstration. And they can get a free view on knowledge nodes flexibility to achieve a great progress on their self-control in learning^[4]. To this end, the technical design should provide such functions as returns, to the next page, bookmark and so on. This can enable learners to have access to any node without getting lost. According to the view of Spiro and Jehng, cognitive flexibility theory requires a multi-sided comprehensive description of the knowledge points. In the hypermedia environment, setting the node for information promotes cognitive flexibility, allowing a variety of ways to explore issues by different concepts or themes, and promoting complex knowledge's application and transformation in the new scenario^[5]. It is true that different users may vary greatly at different levels of knowledge. Therefore, students' awareness of searching for the other nodes which have many links with branch nodes can reduce their loss of important information in the choice of considering the hierarchical concept node distance.

Providing structured auxiliary interface. First, improve the curriculum structure. It is important to confirm the position of the information based on different components of a clear mandate according to the task design navigation. Salomon noted that the use of hypertext makes learners have to consider not only the views but also their contacts and structures. Therefore, knowledge point design should be shown in lines or nets. Second, the way of hypermedia teaching resources presentation. The law of presentation should be consistent with human perception to make people quickly find what they need. For this purpose, the view on the page should provide guidance, which helps to solve the lost learning and cognitive overload problem. While this way has been inconsistent with the intention of hypermedia, it is helpful for those beginners who take small-scale hypermedia courses^[6]. Third, provide structural navigation. Janasson's experiment result shows that only enhancing the view of knowledge level of treatment does not produce a deep dealing means or meaningful learning. The interface that fits

information retrieval more is not a tool to raise learning effect. But the structured icon support can help beginners get an access to knowledge in the field^[7]. By using support features that exist as a natural part of the hypermedia interface, users are less likely to notice the scaffolding's presence. For example, by simply highlighting certain links or suggesting paths through the material, the hypermedia design can aid learners in main-taming focus on their learning goals and can control frustration by preventing disorientation in the information space^[8].

3.3 Hardware level: designing effective teaching hypermedia products

Hypermedia products should be designed according to the aim of teaching to ensure that products' content and course requirements are in coordination with the teachers and the school practice system. Users should be encouraged to determine their own learning path, follow the authors (or developers) of the line or some connection; Hyper-media products should get the functions of encouraging students to explore information, stimulating students' interest, and arousing students' exploring desire. The developer should pay attention to the length of time that teachers and students work for the limitation on teaching time. Learners must be allowed to work within the time limit made by school. Teachers should be allowed to select the information they need from the hypermedia's database. And developers should focus on how to improve and take advantage of the output capacity of the database information so that the information could be used to serve the teaching and research purpose. Meanwhile, developers should pay attention to the increase of input capacity of the database so that teachers and students can file their own textbooks, audio parts, graphics, data entry, to extend the effective use period of products^[9].

4 Conclusion

Hypermedia technology provides a strong technical support for the development of education. Nowadays, it has become a common phenomenon that teachers choose to complete the teaching content with the help of such hypermedia as computers, networks, projectors, touch screen computers and other advanced tools. Hypermedia improves the depth and breadth of teaching, changes the teaching content, teaching methods and so on, which eventually leads to a fundamental change in education concept, teaching theory and even the whole educational system. Now, hypermedia technology has become a core technology in modern educational technology. And with the development of hypermedia technology, hyper-media implement a variety of changes. This change is mainly shown in the trend that hypermedia develops into intelligent hypermedia and collaboration hypermedia. It is true that the hyper-media technology is still at the new stage of its development and it will develop with the new technological innovations and new applications. In educational hypermedia application process, there remain many theoretical and practical problems to be solved. It has its difficulties and limitations to apply it to specific educational teaching environment. For example, how to develop intelligent hypermedia learning materials, and how to overcome the limitations on learning that hypermedia learning has brought about. Such issues need further exploration and research. With the development of hypermedia technology, new problems and new challenges for hypermedia instruction will continue to appear.

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