

# Computer Assisted Education System based on Human Computer Interaction (HCI) and Internet of things (IoT)

Chunli Song

Lijiang Teachers College, Lijiang, China

**Keywords:** Computer assisted, educational system, human computer interaction, Internet of things.

**Abstract.** Computer assisted instruction (CAI) is a kind of modern teaching technology, which has been paid more and more attention by people. Computer assisted instruction is the use of computer as the main teaching media to carry out teaching activities, not only the use of computers to assist teachers in teaching, but also provide a more vivid teaching environment. The computer can not only show simple words, numbers and other characters of teaching information, but also the output of animation, video, images and sounds, can very easy teaching information, text, voice and multidimensional education, the dissemination of information, enhance the real pro and expressive information. In addition, the computer as a teaching media, students can use a certain input and output equipment, through the human-computer interaction way of learning, this human-computer interaction is unique to the computer media. These are the projector, TV and other one-way media can not be compared. Although in recent years, with the rapid development of Internet of things technology, the theory of things is still in the development stage. The Internet of things is a typical information and communication system, which not only has the ability of information storage and transmission, but also has the ability of collecting and processing information.

## 1. Introduction

In the developed countries, the main task of graduate education is no longer the vocational education of professional skills, but the ability to cultivate useful information for the research fields and to innovate on this basis. Corresponding to this, the graduate course teaching also has the renewal, the deeper connotation and the request. In contrast, our graduate education backwardness has become more prominent, the main performance is: the one-way mode of teaching behavior, students access to information channels, information cited low level research results cited rate is low. Learning from the successful experience of other countries, it is an effective way to introduce the computer multimedia technology into the teaching process. Therefore, we have carried out the practice of the computer multimedia assisted teaching and the purpose is to change the present situation of one-way teaching, to build a new, open two-way teaching mode, and to achieve a true multi direction teaching.

Most of the computer aided teaching is to observe the class, and the information technology is not really integrated with the subject teaching. This is mainly because in the process of computer assisted instruction, teachers need to develop their own courseware, and the development of courseware need to spend a lot of time and energy. Although there are a number of teaching software already on the market, the software is not suitable for teaching. In the process of making courseware in many schools exist in such a situation, the subject teacher to write a manuscript, realized by computer programming technology, development of small software a large part of teachers, because computer skills rusty makes the courseware best advantage can not play out, and in practice often due to improper operation and failure, which greatly inhibit the enthusiasm of teachers of self-made courseware.

In fact, in recent years there have been a number of domestic teaching values of the software. If teachers can master the basic ability of using computer, a little training can use them to move at its own will produce small software, work closely with their own teaching process, implementation of computer assisted instruction.

In the past two years, the survey of undergraduate students and the teaching results show that the multimedia teaching is in accordance with the objective teaching rules. It can be said that the human-computer interaction teaching mode has changed from the traditional one-way to two-way.

However, it is not enough for the graduate education to adopt the two-way mode of undergraduate teaching. From the previous analysis, this model can not fully meet the needs of graduate education. We believe that the appropriate model is that students and teachers together to develop teaching programs, the collection of materials and information, courseware and between teachers and students and students exchange. In this process, computer multimedia technology plays a bridge role.



Figure.1 Human-computer interaction

## **2. The Proposed Methodology**

### **2.1 Computer assisted instruction**

Integral ware is a kind of thought, it is a kind of thinking about the development of CAI system, and it is a new teaching software development and application mode. The integral ware person thinks that the integral ware is composed of the integral ware library and the integral ware platform. The integral ware library is a collection of teaching materials and expressions, which consists of five parts: the multimedia teaching database, the micro teaching unit library, the virtual integral ware resource database, the data presentation method library and the teaching strategy database.

The integral ware combination platform is a software environment for teachers and students to use the combined integral ware library and finally used for teaching. The process of classroom teaching, is a teacher according to the actual needs of teaching, facing the different teaching object in a teaching stage and teaching objectives, make full use of teaching materials, teaching strategies, and make effective courseware the myriads of changes.

### **2.2 Multi media teaching practice under the guidance of multi direction thinking**

In the early stage of the development of architectural environment physics courseware, we put forward the concept of "open framework" for the goal orientation of "multi direction". The so-called open, that is, the structure of the script will be the course content, the structure of the material and the process of separation, from a dollar into multiple, from static to dynamic, from closed to open. The significance of the open framework is that it really realizes the transformation of the main body of the teaching, and the students are no longer just an educated person, but a new type of learner. But this kind of role transformation is marking the thorough transformation of the traditional teaching method, and it will get rid of the predicament in the past teaching process.

On the basis of open framework, it is very important to design a friendly and convenient interface. Human computer interface design level, will directly affect the operator's feelings and the efficiency of the system. In the design of human-computer interaction interface, the main consideration of the following aspects, that is, interactive system of friendliness, flexibility, transparency, consistency, artistry.

The biggest difference between multimedia teaching and blackboard teaching is that the former has great technical advantages in the way of information expression and transmission. Therefore, the production of CAI courseware, you can make full use of the advantages of this technology. In the aspect of information expression, it emphasizes the synchronization and integration of text, sound, image, animation and video.

The new model has realized the real-time communication and sharing among the scientific research results. In the multi type teaching process, teachers and students can make use of electronic means, a large number of field data, engineering use of the feedback information to be retained and organize, communicate through multimedia courseware in the form of the past is difficult to use

language and drawing expression vividly the results. For example, before the theatre sound design, the designer will propose some expected results, and through appropriate means to realize, different people will offer different characteristics of the program, and how to use the final before is now through electronic equipment settle a matter by leaving it unsettled, and computer technology to carry out field sampling, the construction process and use case record classification and treatment, analysis of the causal relationship between the actual effect and design means, whether it is successful or not will be the case for the future work plays a role. In addition, through the exchange of teachers and students at any time, are open to each other's ideas. In this process, the role of teachers and students from the traditional one-way indoctrination, leap into a common participation, interactive inspiration of the new model.

### **2.3 The development of multimedia courseware**

With the continuous development of science and technology, the level of research in various disciplines has become more and more deep, the scope is also more and more broad, involving all aspects of people's daily lives. Such as the construction of environmental physics on the cover of the indoor thermal environment, indoor lighting and lighting life, building insulation, noise control, energy saving, environmental protection, art lighting and evaluation, green building and other aspects. Therefore, the subject of research is very rich in the form of expression, the direction of diversification. The application of new materials and new technologies has made the construction products develop towards the direction of high technology. These trends provide a practical stage and favorable conditions for the introduction of multimedia technology into teaching.

### **2.4 Information model of Internet of things**

Internet of things literally is easily interpreted as a network connection items. Networking is actually the Internet features. Items referred to as it must have the Internet, for a global information infrastructure connecting items. According to this definition, there is no real sense of the Internet of things, some of the existing network connection items should be accurate called goods intranet.

In order to ensure the networking information model can meet the application requirements and solve things theoretical or technical problems, must be analyzed objectively. The key demand analysis is to grasp the core of the case, and can put these core cases to form a complete correlation structure between cases. We apply this integrated case structure called abstract case model.

According to the description of things related definition and characteristics and requirements, we describe the networking participants and operation and related party, in order to constitute the abstract use case model of the Internet of things. The mainly focuses on the definitions of things and application related characteristics and needs, so things can abstract model of information collection, transmission and fusion processing and application perspective of the formation of IOT operation, can be directly related to network information model related classes and methods. IOT abstract use case model to provide the necessary basis for constructing networking information networking model.

### **2.5 IoT protocol architecture**

In the Internet of things to achieve stable and reliable data exchange must abide by some predetermined criteria, which provides some criteria for exchanging data format and Realization of event sequence is called a network protocol. Therefore, network communication protocol, Internet network control platform, networking application terminal platform the structure of the Internet of things.

The network interface layer, network interface layer of the Internet of things is responsible for the information collection and acquisition, and the information for effective fusion and compression, the transmission medium used by the main radio waves, infrared light, etc.

The network layer: the network layer of the Internet of things is mainly responsible for the IP addressing and routing discovery and maintenance. All kinds of things in the heterogeneous network can communicate with each other must be very complex hardware address translation, this work is almost impossible for each node in the heterogeneous network.

Transport layer: the transport layer of the Internet of things is mainly responsible for the transmission of data flow control, with the function of reuse.

