The Auxiliary Function of Computers to Aerobics

CAO Weiping¹,*, ZHOU Guangchun¹

Institute of Physical Education
China West Normal University
NanChong 637009, Sichuan, China

Abstract — With the development of science and technology, computer has been accepted and used by the public, people can get more information and a wider exchange space from the computer. The computer plays a great role in promoting the dissemination and development of things, and aerobics is no exception. The computer provides more information and exchange opportunities for the development of aerobics. This paper is to explore the role of computer in the aerobics. This paper introduces the computer’s influence on the aerobics. First, the article starts with the function of the computer. Then, the article analyzes the computer for the development of aerobics in many ways. Computer has the promotion effect for the development of aerobics. Because the computer is used more and more frequently, the role of the computer for aerobics will become more and more important.

Keywords - computer; aerobics; development; auxiliary function

I. INTRODUCTION

Aerobics originated in 1968, emerged in the early 1980s and today has experienced more than 40 years. Because of the increase of domestic and foreign competition, more and more perfect rules, and hot mass aerobics, aerobics is gradually moving towards maturity. Aerobics is in the accompaniment of music, the basic method is the physical exercise, and the foundation is the aerobic exercise, which is a sport that can improve health, shape the body and play a sport (As shown in Figure 1). Compared with other ways of physical exercises, aerobics has its own characteristics, mainly including the fitness of timeliness, strong time sense and law, height and art and wide applicability. Today, the development of the computer is more and more fast, and the role of the aerobics project is more and more obvious.

II. THE APPLICATION OF COMPUTER IN THE TEACHING OF AEROBICS

A. The Source of Computer Assisted Instruction

Computer Assisted Instruction (CAI) is the use of computer simulation of teachers’ teaching action, the students and the computer can establish a link to build an interactive platform and achieve the purpose of physical education [1]. In 1959 IBM which is the American computer company successfully developed the first computer aided teaching system in the world. The computer aided teaching system caused the attention of many countries, derived many products, and gradually formed a computer aided teaching technology industry. The development of the system has a long history of development. In traditional CAI System, the choice of teaching methods and teaching objectives of the control is very rigid, which can not adapt to the actual situation of the students in the teaching practice. Along with the development and maturity of the computer science and artificial intelligence (AI), artificial intelligence is introduced into the Computer Assisted Instruction system, which makes the system have a great improvement in the flexibility and can judge the teaching method. This technology has greatly improved the application value of the system, in the practical application, the teaching content of the arrangement and the choice of methods are more targeted. Under the guidance of the theory of artificial intelligence and cognitive science, the system is further developed into a smart Computer Assisted Instruction system. This is an important breakthrough in the application of computer technology, which opens up a new field of technical application, is a major update of teaching methods, and greatly improves the quality and efficiency of teaching.
B. Computer Aided Teaching of Aerobics

The remarkable sign of modern education is that the network and computer technology are playing an increasingly important role in the classroom teaching. Previous aerobics teaching was taken the teacher face to face students. Because of the advent of the computer, the teacher can use multimedia technology to make multimedia courseware, so that learners can enjoy the face-to-face feeling of aerobics in the no face-to-face situation. In multimedia courseware, students can hear the teacher's voice, see teachers' state education, and understand pictures, animation, audio and video data [2]. Learners can participate in the course of teaching, choose the progress of the courseware according to the degree of master, and choose to learn certain parts or skip some parts.

Computers can combine text, graphics, video, animation and sound information, and complete a series of random sexual intercourse through a comprehensive treatment. The modern network information technology not only changed the traditional teaching method, but also made the teaching content, teaching form, teaching method has been changed. For example, computer network interactive learning system has changed completely the traditional aerobics teaching mode, the focus of teaching has also changed from "teaching" to the students' "learning". The teachers control the synchronization passive learning state transition for active two-way exchange of learning, which enables students' initiative to fully reflect, students become the main body of the whole teaching process. The computer teaching can accurately analyze the actions and correct students' aerobics work and action which break the difficulties, computers which are used in auxiliary aerobics teaching make aerobics class more perfect.

C. The Application Design of the Computer Assisted Instruction System in the Teaching of Aerobics

The model of the application of the design of the Computer Assisted Instruction system in the teaching of aerobics is shown in Figure 2.

The determination of frame structure is the first step to establish the intelligent Computer Assisted Instruction system, which needs to be carried out in the premise of the teaching purpose and task of the aerobics. Then combining with the system focus designs the overall framework based on the syllabus. In order to make the aerobics teaching activities more effective, the overall frame structure design should be simple, intuitive, clear and interrelated. Because of combining with aerobics teaching materials, the design of the computer aided teaching system is divided into four main modules, respectively: action basic theory module, teaching venues and the principles of evaluation module, action teaching and difficult movements and playback module, assessment module [3]. The basic theory of action includes the research method, the teaching theory and the training method. Teaching venues and the principles of evaluation module mainly includes aerobics formation layout, specifications clothing and decoration, judging standards, referees duties, analysis on the common errors in the judgment of the aerobic gymnastics and troubleshooting unit which exists in the form of man-machine interactive. Teaching action and important and difficult action replay module mainly includes the technical movement analysis unit, essentials analysis unit, a teaching method of basic unit, error prone action analysis unit, regulating the action demonstration unit, important and difficult movements analysis unit and action video decomposition teaching unit.

Computer Assisted Instruction system contains a very rich teaching resources, including text, animation, video, sound and pictures, etc. So in the process of building the Computer Assisted Instruction system, the collection of related materials is very important. In order to make the Computer Assisted Instruction system more and more possibly enrich the teaching resources, in the preparation stage of the material, we need to follow the following procedures.

![Figure 2. Process model of intelligent Computer Assisted Instruction system.](image-url)
First, we should choose the teaching experience of the aerobics teachers who can determine the scope of the material of the Computer Assisted Instruction system, and carry out the screening of material according to the teaching tasks and objectives. After determining the material, we can design the text, record the sound and select the appropriate background music.

Second, we shoot video teaching resources, including the specification of action video and error action video, which can be learned by students.

Third, we should take the video of the aerobics contest, which uses JVC digital camera to capture the organization, division of labor and gesture of the body of the aerobics contest. Finally with the help of 3D animation production technology and image processing software, we set the material into a teaching valuable resource, and insert into the corresponding plate after the completion of the computer aided teaching system.

In addition, analysis and assessment of the situation in the comprehensive evaluation module can also train students' ability of observation, analysis and comprehensive control, improve the teaching of aerobics fun, attract students to explore and get progress in the exploration process. The establishment of intelligent computer assisted instruction system overcomes the monotonous traditional teaching mode whose teaching effect is low, lets students' enthusiasm for learning to be inspired, and let the teaching quality to achieve a qualitative leap.

D. Commonly Used Computer Software in the Teaching of Aerobics

As shown in table 1, in the 30 aerobics teachers and computer software professional teachers surveyed in the survey, there are many types of computer teaching software, which mainly includes image processing, video processing and audio processing. From table 1, we can see that image processing have a relatively high frequency in the use of the software, Photoshop 36.67% and Fireworks 33.33%, which shows that the application of the image processing software in the teaching of aerobics is relatively low. Frequency processing software use frequency were divided into edit cool 50% and Audition Adobe 70%, which shows that the frequency of audio processing software used in the teaching of modern aerobics is higher. The choice of teachers reached a total of 36 passengers. In the application of video processing software, 60% of the teachers chose to use Ulead Video Studio, 56.67% of the teachers chose to use Windows Movie Maker. There are 35 people in total video frequency of the total number of teachers, and the number of teachers who often use audio processing is not small [4]. It shows that in the teaching of aerobics, audio processing applications are the most, followed by the video is the last picture. In the horizontal observation of all kinds of software use cases, the highest proportion of two categories is the other software and Adobe company's audio processing software.

<table>
<thead>
<tr>
<th>Project</th>
<th>Photoshop</th>
<th>Fireworks</th>
<th>Cool edit</th>
<th>Adobe Audition</th>
<th>Ulead video studio</th>
<th>Windows movie maker</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>The number of Teachers</td>
<td>11</td>
<td>10</td>
<td>15</td>
<td>21</td>
<td>18</td>
<td>17</td>
<td>22</td>
</tr>
<tr>
<td>Percent</td>
<td>36.67%</td>
<td>33.33%</td>
<td>50.00%</td>
<td>70.00%</td>
<td>60.00%</td>
<td>56.67%</td>
<td>73.33%</td>
</tr>
<tr>
<td>The number of Students</td>
<td>28</td>
<td>18</td>
<td>31</td>
<td>47</td>
<td>28</td>
<td>20</td>
<td>31</td>
</tr>
<tr>
<td>Percent</td>
<td>40.00%</td>
<td>25.71%</td>
<td>44.29%</td>
<td>67.14%</td>
<td>40.00%</td>
<td>28.57%</td>
<td>44.29%</td>
</tr>
</tbody>
</table>

E. Smart Computer Assisted Instruction System is Used in Aerobics

Intelligent Computer Assisted Instruction system is mainly based on the goal of teaching in the content organization; the understanding of the knowledge content of artificial intelligence will also have an impact. The system will analyze the received information, contact the database of knowledge, set AI system comprehensive judgments based on all the factors according to the reasoning, develop a method of teaching intelligent, select or create appropriate teaching presented information to students. The teaching process is based on the reality of the students [5]. To sum up, the technology of Intelligent Computing assistant teaching system is composed of database and intelligent processor. Organizational structure as shown in Figure 3, main structure is composed of parallel to the teachers, students and diagnosis model [6]. It provides expertise through data repository to collect information input processor, and then make a determination process, the establishment of a complete education system.
Cognitive ability is a comprehensive ability of a person's learning ability, memory and thinking, the main performance is the ability to analyze problems. Based on the cognitive theory, the model of ANN (BP) is used to establish the cognitive model of students' learning level and cognitive ability [7]. The cognitive activities according to certain standard is divided into six levels to input the BP model, six levels respectively are memorizing, understanding, standard is divided into six levels to input the BP model, six ability [7]. The cognitive activities according to certain cognitive model of students' learning level and cognitive theory, the model of ANN (BP) is used to establish the learning ability, memory and thinking, the main performance level, physical function, learning conditions. In concept, the 12 elements are integrated in a three-dimensional space, which is composed of a nonlinear mapping:

$$ FBP; XYY, X = \{ X1, X2, X3, \ldots, X12 \} \quad (1) $$

$$ Y = \{ Y1, Y2, Y3 \} \quad (2) $$

Among them, X1, X2, ... , X6, respectively is the 6 aspects of the learning process of the evaluation test results, X7, X8, X9,..., X12, respectively is the name, gender, age, education, physical conditions, learning environment. Y includes poor(0-59), medium(60-75), good(75-90), excellent(90-100), Y1, Y2, Y3, respectively is student mastery of meaning, technology, application.

Particular aerobics teaching content and judgment mechanism complete treatment process are: The specific data were collected from the cognitive model, and the system was used to carry out the intelligent processing ability. Expression in the system is: IF <Student level representation symbols> THEN <newly developed teaching programs>. Examples are as follows:

IF (knowledge representation content) = (poor)            (3)

THEN (content knowledge and detailed explanation)        (4)

IF (knowledge representation content) = (middle) AND (knowledge application level) = (poor)   (5)

THEN (the contents of the review, a comprehensive explanation, contact the application)   (6)

Throughout the development of teaching aerobics program is processing a data processor, integrated learning degree represents the value (Y1, Y2, Y3) processes according to the above system appropriate treatment, the next step is to develop teaching programs. The process of teaching is to apply this process repeatedly, ensure that enhance students' cognitive ability in every aspect, and ultimately reach the required standard BP calculation method.

III. COMPUTER IS APPLIED TO AEROBICS ELECTRONIC PUBLICATIONS

Currently books are generally related to aerobics distribution CD, especially the information content is very large. Today, the library collection is not only a paper book, but also the CD-ROM and other types of electronic books [8]. Readers do not need to spend a lot of time to read a searching cards, you can just retrieve any of a chapter of a book, a page or a sentence with just a few keystrokes. Computers make people more convenient, easier to obtain the relevant theoretical and technical knowledge of aerobics; people can understand the aerobics more in-depth. It can be seen that the computer is a very good media for the development and implementation of aerobics.

IV. THE COMPUTER PROVIDES THE NEW VIGOR FOR THE CREATION OF THE AEROBIC

With the development of computer, people can use computer to compose in a composition system, the screen will display the staff or numbered musical notation, people can control the playback start, stop at any time, conveniently change and play to listen until you are satisfied [9]. Using computer to create, not only can save a lot of manpower and material resources, but also can provide better performance and greater creative freedom for the creators. "Music is the soul of aerobic ", music is an art of expressing thought and emotion, and it is a kind of sound assistant with the aerobic exercise. It can not only improve the exercise of life, but also fully show the theme of health and beauty. Computer makes music production convenient, fast and easy to operate. Computers makes different styles and features of the music in the aerobics. It can make the aerobics inherent emotion and external beauty show incisively and vividly. We can see the influence of computer on the aerobics.

People used to learn aerobics by motion graphics, it is difficult to learn, and difficult to find the body feeling music and action [10]. The appearance of the computer is a great convenience for the creation of the audio and video; makes the aerobics and music achieve a tacit understanding. It is easy to give a very new feeling and provide people with...
more information about aerobics intuitive, so that people can easily obtain new information in a very short time. Especially through aerobics teaching video, people can learn action without the coach; this provides a great convenience for the study of the aerobics, the development of the aerobics play a great role which promotes more and more people to understand and love aerobics.

V. THE COMPUTER IS CONVENIENT FOR THE INFORMATION MANAGEMENT OF AEROBICS

Traditional management information systems are generally written, data and table [11]. After computer processing, kinds of information become diversified, including sound, animation and image in addition to the text, data and tables, which provides a great convenience for the development of aerobics in order to provide a great convenience [12]. For example, the competitive aerobics athlete information management system can not only query someone's name, gender, age, but also can query looks and sounds, and can query the competition result and related interviews in recent years, etc. This makes the management of aerobics to scientific, orderly and professional. Scientific information management for the development of aerobics has a particularly important significance.

VI. THE COMPUTER PROVIDES A PLATFORM FOR THE AEROBICS ENTHUSIASTS TO EXCHANGE

The emergence and development of the computer has narrowed the distance between people and people [13]. We can exchange and study with the aerobics enthusiasts all over the world. The computer appears in the aerobics enthusiasts of the web, post bar and so on, which provides a very good exchange and learning platform [14]. In this platform, aerobics enthusiasts can put their own learning experience and feelings to share, explore, learn from each other, and achieve the purpose of mutual progress with other enthusiasts. At the same time, people can deepen the interests and hobbies of aerobics in the exchange and learning. This exchange of the platform allows people to more easily contact with the aerobics and gradually accept the aerobics, which plays a great role for the popularity and development of aerobics.

VII. CONCLUSION

Needless to say, there are many factors to promote the rapid development of aerobics. But the appearance of the computer is very important, its appearance and application makes the development of our country's aerobic exercise have a new platform with the progress of the material. By the above analysis, we can see the great promoting effect of the development of our country's aerobic gymnastics. Therefore, we should give full play to the function of the computer in the future, and make full use of its advantages. We make it play a greater role in promoting the healthy, fast and orderly development of aerobics.

REFERENCES