Computer-Aided Technology Application in Basketball Tactical Training

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Abstract

With the development of basketball, individual technical ability is growing, shooting is more and more accurate, offensive means are more and more rich, facing the complex and changing field conditions, if just blindly individual defense, it is difficult to obtain significant results. CAI is a product of the era development and the problems in the process of its advancement which exist in the understanding and the resource reserve are inevitable. For these phenomena, not only the auxiliary and order principle are supposed to be established in the process of applying the computer technology in basketball tactical training, but also the computer-aided technology application value ought to be reexamined. The specific training to teachers of different subjects needs to be strengthened and the construction of CAI network database should be consummated in time. This paper choose CAI applied in Zone defense technology, with variability and flexibility, can effectively limit the player with strong individual ability and come through the defense, and therefore zone defense tactical attract more teams' attention.

Keywords: CAI; Zone defense technology; Basketball tactical training

1. Introduction

With the rapid popularization of the modern education technology in the field of training, the sport training reform with the computer-aided training as the main characteristics arises at the historic moment [1]. The network training of Computer Assisted Instruction is known for its large amount of information, intuitive content, image and other features, which can not only meet the various needs of students' learning, but also improve the students' interest in learning and stimulate students' learning enthusiasm and initiative. As is well known, the sport skill learning of basketball belongs to cognitive domain, which requires a comprehensive cognition to the speed of movement, strength, and the ball's space. If some science and technology can be used when training, it will be a more intuitive display, and is helpful for students to have a clearer and more accurate understanding of ball movement.

Computer Assisted Instruction (CAI) is an assistant basketball tactical training method, which has been widely used in various basketball tactical training activities with the rapid development of computer and network technology since the early 1990s. By means of using a variety of software processing tools, such as PPT, FLASH, 3DMAX, PREMIERE, the basketball tactical training contents are optimized in sound, image, graphics, video and other information processing, then the courseware's characteristics of richness, novelty, interestingness, Figureurativeness and organization are eventually obtained. Information technology effectively support basketball tactical training requires three conditions: material conditions, information literacy and application concept.[2] But in actual basketball tactical training, the computer technology is applied in the rote learning framework, lack of originality and creativity. [3] PPT is only a substitute for the artificial board in the past and the computer is just used to play the PPT. This simplistic use of computer functions severely restricts the innovation and development of information

technology. So how to make full use of computer technology, enrich the basketball tactical training content and improve basketball tactical training effect are need to discuss.

2. The Problems Existing in the Application of Current Computer Technology in Basketball Tactical Training

2.1 Teachers' Understandings of CAI are Polarized

The first kind of teachers relies too much on the CAI basketball tactical training software, leading into electronic information infusion. To prepare a public class or classes for the match, sometimes it takes a person's or a team's too much energy in the courseware manufacture. They always pursuit pure and new in the editing platform, material making software and integration tools, and pursuit full and beauty in the courseware design. They make full use of the existing development tools, including those nonlinear editing and synthesis software, such as Premiere, VideoStudio, Combustion, those animation software, such as Flash，3D Studio，Cool 3D，5D, those graphics editing software, such as Photoshop, Adobe ImageReady, and those general software, such as Author-ware, PowerPoint, JAVA, VB, Microsoft FrontPage, Macromedia Dreamweaver [4]. Those software make teachers become slave of computer technology and loose the leading role in the class. The second kind of teachers just take the CAI as a replacement of traditional teacher's writing and move the course content mechanically to the screen. Although this approach can save time, it can't realize the promoting effect function of multimedia in the basketball tactical training, at the same time it can cause textbook strangeness to students, turning into restarting reading textbooks. Both extreme phenomena have violated the basic law of education. In the pursuit of basketball tactical training thought on "advanced" and "conservative" to keep the dynamic and static attitudes, there should be a kind of cracking method to remove two phenomena.

2.2 Lack of the CAI Resources

The lack is mainly showed as follows. Firstly, the developed CAI software are not good enough. From a professional point of view, the CAI software are developed by professionals, who don't have enough related subject knowledge, so the script cannot meet the scientificity and pertinence, resulting in some disciplines teachers incorrectly using CAI software in more professional. At the same time, due to the influence on software development and market needs, some have no suitable specialized disciplines software and only make use of other disciplines software, making it hard for teachers to hand. Secondly, the number of high-quality CAI courseware is too small. Due to the short application time of computer and network technology, the CAI software is not widely used and the development pace of CAI software is slow. Especially the lack of the talent team who keep good balance between technology and related subject knowledge causes the few number of high-quality CAI courseware.

2.3 The CAI Software Type is not Corresponding with Basketball Tactical Training Mode

The existing CAI basketball tactical training pattern mainly has the following kinds. One is simulation experiment CAI and this kind of software is mainly applied in the physical and chemical reaction experiment. Two is demonstrating CAI and this kind of software is mainly applied in abstract mathematics and physical phenomena and processes. Three is self-test practice type CAI and this kind of software is mainly applied in autonomy learning or stage inspection. Four is instructed type CAI and this kind of software is mainly applied in lectures or autonomy learning [5]. The modular and systematic design at the beginning development of the CAI software cannot make some

teachers' ideas into reality. At the meanwhile, due to the factors related to intellectual property rights, those courseware which have been formed are only allowed to be played mechanically on the computer and cannot be flexible used for teachers, resulting in being abandoned for no selective choice.

3. The Principle Established in the Process of Applying Computer Technology in Basketball Tactical Training

CAI has great practical significance to modern education and incomparable advantage over other basketball tactical training means. Therefore, we should positively develop and utilize the function of CAI on the basis of no conflict to basic education law and compliance to the principle of education.

3.1 CAI Can't Replace Teachers' Dominant Position

In comparison of computer aided basketball tactical training and the traditional education basketball tactical training means, the advantage of the computer aided basketball tactical training is obvious, but teachers' dominant position in the process of basketball tactical training cannot be ignored. Primary and secondary should be clear, and position accurate. In the process of practical basketball tactical training prominent teachers' vivid lectures, brief blackboard writing and timely feedback communication between teachers and students are very necessary, and the effect of mobilizing students actively into basketball tactical training process cannot be replaced by other basketball tactical training means. If teachers' dominant position does not exist in the practical basketball tactical training, the practical basketball tactical training effect will be greatly reduced. A class popular with students holds the key in teacher's lecture and the multimedia only has the auxiliary function. Therefore, the basketball tactical training mode of teacher-dominating and students-oriented should be defined in the practical basketball tactical training process.

3.2 Correct Choice to Arrange Courseware Content

The nature of the multimedia basketball tactical training lies in the teacher presenting the content clearly and systematically, but not making the students achieve the purpose of self-learning through multimedia. Therefore, In the process of making and use of multimedia basketball tactical training courseware teachers cannot blindly abuse of courseware for basketball tactical training or weave all the basketball tactical training content and blackboard writing into courseware played in class without trade-offs. And moreover, teachers should attach great importance to the content and should not put all the irrelevant colorful things in front of students, achieving the goal of an eye-catching. These courseware often do not separately emphasis on the important and difficult points, and even inordinate, and eventually backfire. Hence, in the courseware manufacture process, we should pay attention to the applicability and practicability, and the courseware should be based on the basketball tactical training outline and basketball tactical training goals. It also should be adapt to students' age and cognitive law, and highlights the basketball tactical training emphasis and difficulties. If teachers have the targeted basketball tactical training goal and make the courseware according to the students, which are full of content and visual impact, it will finally achieve the expected basketball tactical training effect.

3.3 Persistent Stick to the Students' Need

During the process of using computer technology making multimedia courseware, students ought to be the demand body. Teachers should stand in the perspective of students considering accuracy of topic selection, acceptation and cognition, interactivity,

aesthetic standard, the cultivation of critical thinking factors whether are suitable. Under this premise, the teachers can design and make the courseware which has a strong pertinence to students.

3.4 The Overall Production of Computer Assisted Instruction Software for Basketball Tactical

This software sets up specific guiding thought and script, which has overall design for training objectives, training content, training strategies training activities design, as well as function modules. The use of audio and video fast segmentation conversion tool, Photos and other multimedia software can carry on the function of processing, text, video, pictures and other materials, so as to make the overall production of computer assisted instruction software for basketball tactical by using flash. Moreover, it can improve the final perfection of the software with creative thinking and specific creative composition. In addition, it can comprehensively "scan" every interface and every function from the beginning to the end, in order to complete the synthesis of the system. The overall production of this software is shown as follows in Figure 1:
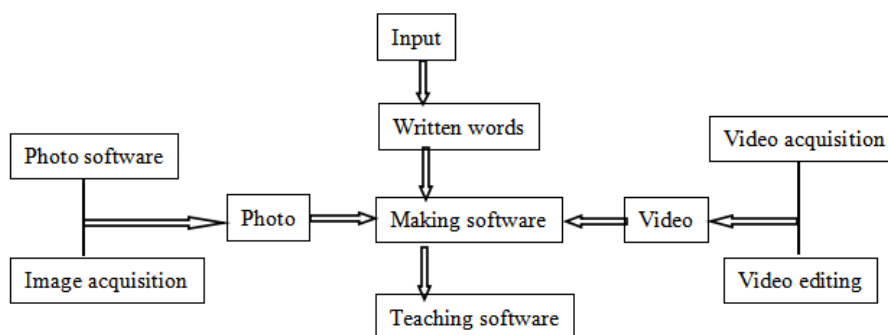

Figure 1. The Integrated Graph of Computer Assisted Instruction Software for Basketball Tactical

4. Improve All Aspects of Computer Aided Basketball Tactical Training

In order to be able to put the CAI's real application in the basketball tactical training process, the work of various parts ought to be done well.

4.1 Reviewing the CAI's Application Value

In the CAI's daily basketball tactical training process, teachers consciously or unconsciously use them for the basketball tactical training. However both education management institutions and schools should be cautious to the problem that different disciplines teachers use the CAI. Neither unified treatment, nor let it be. Those departments should make targeted reasonable request to different disciplines. For example, during the higher mathematics class, if teacher use too much multimedia, students could not keep pace with the teacher due to the fast demonstrating and no reasoning process in which teacher leads students. Thus, teacher should take more use of traditional plate to guide students to gradually transform of thinking. But for the computer, mechanics, architecture class, the visualization and dynamic graphics can be used to simulate. So much more research input could be increased to make more auxiliary courseware. Each course should be relocated in basketball tactical training practice constantly, cognized and modified to find really suitable CAI software and courseware for their disciplines.

4.2 Targeted Training of Utilizing the CAI Software for Different Disciplines Teachers

To promote the rapid development of computer assisted instruction, such things should be finished. Firstly, leaders should gain the certain knowledge of CAI and also pay attention to its promotion. Under the existing system in China, any work style which has common sense needs to be promoted by higher institutions and leaders on the premise of main demand. Of course, leaders also get familiar with the CAI in the process of studying, communication and training. After direct acknowledges and grasp of the rule and method of the matter's development, it is much easier for the leaders to promote the rapid development of the transaction. Secondly, the ability training of teachers using the multimedia auxiliary basketball tactical training should be emphasized. According to the disciplines characteristics, teachers' training ought to be targeted and focused on short-term hierarchically to improve their information literacy and the ability of computer application.

4.3 Strengthening the Construction of the CAI Resource

Each education unit ought to have its own CAI resource for self-use or partly network share. The main ways of the construction of CAI resource are as follows. Firstly, purchase and collect related data in the early stage, such as video, audio, images and animation. Secondly, form CAI manufacture teams and vigorously develop courseware suitable for their discipline characteristic. According to the needs of those subjects, form big team to develop the discipline CAI resource, then it is divided into several groups by the chapter of each subject. Both teachers and professional participate in and cooperate to make courseware of the subject, and finally integrated system is jointly used to feedback and modification. Through repeated daily basketball tactical training practice and adjustment, it can ensure the timeliness and accuracy of the courseware, increasing energy and use value of the CAI resource. Thirdly, collect the corresponding software support system, such as slides making software PowerPoint, diagramming making software Visio and AutoCAD, image processing software Photoshop, development integration platform Authorware and Geometer sketchpad, animation making software Flash, 3DMAX, Maya, video editing software Corel VideoStudio, EDIUS, Adobe Premier, Adobe After Effects.

Computer assisted instruction technology come into being with the needs of the time education and staggered in the time development, and will act as appropriate auxiliary role in the future basketball tactical training practice. It obtains more needs of the management' persistent promotion, teachers' continuous efforts and the subject students' actively participation to accurately locate the function and mode of the computer aided basketball tactical training.

5. Zone Defense Tactical Technology in Basketball Tactical Training

5.1 Zone Defense Tactical Awareness and Training

To play good defense tactical in the basketball tactical training, it is unavoidable to train before the basketball tactical training. We need to have a specific concept what is zone defense, grasping well zone defense tactical' development and change. Mainly from the following three aspects to learn and train zone defense:

First, some people may have the wrong understanding, they think the defense is rigid, too passive, and unable to withstand the changes in strategy. If there is no defense, that left only man-to-man defense, facing the attackers of strong personal ability, the defense would be empty. Because of having not deep understanding of zone defense tactical, you may consider zone defense is negative defense, without a collective zone defense tactical, of course, it cannot be sufficiently powerful. In the zone defense we need to timely adjust

the emphasis of defense based on the opponent's offensive system, focus on defense for strong scoring ability, and impose defensive effectiveness.

Second, it is necessary to understand the development of the zone defense, initially it is marking tactical, and later with a number of fixed zone defense tactical, and finally developing into a comprehensive zone defense tactical, by reading the basketball tactical training, you can make targeted zone defense tactical. So the zone defense began to have "living thought", transforming the defense based on the realistic.

Third, training is needed, if having not tactical training before the basketball tactical training, it cannot play a decent fit in the basketball tactical training. It is necessary to conduct research on the history of video and tactical analysis during training. For important tactical moves, defense tactical are needed to keep combat training. You need to seriously understand own team's defensive weaknesses, and to make up for deficiencies through collective defense, while to adjust the athletes' good physical condition, in a lot of basketball tactical trainings, because the main players physical exertion premature is too early, the team are turned defeat into victory by the opponent lightly [6].

5.2 Zone Defense Tactical Requirements

Zone defense requires players to be arranged when the other team throw in the ball or losing own goals. If losing the ball in front court due to being stolen or the error, all the players should get back in time, and try to avoid being hit fast-break by the opponents and dribble the ball to prevent the other's progress. In trench warfare, you should have special care of the opponents' offensive strengths' players, and take appropriate defense based on the offensive side. The team should maintain a tacit understanding between the players, closer in time to the defensive side of the ball handler, and cut off passing lanes, causing the ball handler who barely shots or turnovers[7]. In the direction of the mobile defense, the players need timely help the passing person, and avoid the opponent can directly open shots after passing. Zone defense is the formation of much less proof through an active athlete running, if the other party has a good No. 1 players, the ability to pass the ball more prominent, which is likely to cause up against not timely, resulting in open shots , easy baskets. In order to compensate for the lack of zone defense, you must understand the opponent's strengths and weaknesses, such as the other players, whose shooting is not acute, properly allowed open shot, and a strong focus on the players who have strong ability to score. When sealing the passing lanes, you can intentionally or unintentionally let out to the opponent's more mistakes or favorite singles player routes, force them to pass, and defense the singles players by double team to reluctantly shot. In this case without worry, we should continue to use this defense tactic, as the other's individual player emotion is provoked, he will not pass the ball, zone defense will produce miraculous. If not scoring defense you can grab a basketball by the top people through zone defense tactical, the sideline players can fast break. In short zone defense should attack different tactical, and have different arm for different teams, not rigid and fixed pattern.

5.3 " 2-1-2 " Zone Defense

There are many ways in zone defense, such as 3-2 defense, 2-3 defense, " 2-1-2 " defense, because the length of this paper is limited, this paper mainly introduces the specific requirements and training of the " 2-1-2 " zone defense. There are main exercises such as judging the opponent's breaking route, to predict and intercept the route in advance during practice, grasping the movement of the opponent, effectively stealing, judging and destroying its passing lanes. It is that through cooperation and division of labor between the players, zone defense takes the use of collective force on the offensive conduct of the other side, and has the purpose of limiting and destruction. In "2-1-2" zone

defense, our players' positions are shown as blues in Figure 2, the reds are the offensive team players.
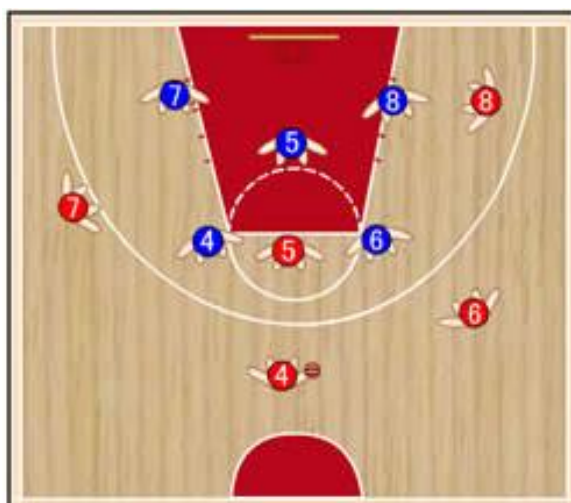

Figure 2. " 2-1-2 " Zone Defense

Here for the "2-1-2" defense gives the corresponding defensive manner:

First, defensive player would like to strengthen the defense of favorable position for attacking, if the 4th red is the ball handler, the 4th, 6th should be close to the handler, and force him to pass the ball to the 7th or 6th red, after the Red 7or 6 catches the ball, the Blue 4 and 7 defense the Red 7, the Blue 6 defenses the Red 6, which will make it difficult to form an effective attack. Second, predicting the passing lanes and breaking it in advance, if the ball handler is the Red 8, he has only two choices, offensive or passing the ball to Red 6, if he passes the ball to Red 6, Blue 6 should promptly cut off the route, and Blue 5 helps Blue 6, if Red 8 chooses the offensive, Blue 5, Blue 6 and Blue 8 can be close to him, in the case of one offensive and three defense, he is difficult to have a successful attack. Third, facing tactical defense to three points, you should timely defense him and ensure less foul. If Red 7 has strong shooting 3 points ability, Blue 4 and Blue 7 should pay attention to timely running with the ball, go up in time to limit him once the ball is into the hands of Red 7. Zone defense requires a tacit understanding and timely filling in between players, the immature zone defense can easily be cracked. During the competition, the individual's defensive ability is important, but without team work, it is difficult to win the basketball tactical training, which requires players to practice more and form tacit understanding in order to have an iron-clad defense.

5.4 Constructing the New Training Mode of "The Ternary Integrated"

In the reaching process of basketball technology courses, "training", "learning", "practicing" are integrated. The new learning mode of basketball movement skills is composed of Computer Assisted Instruction network training, classroom practice and training competition, which are supplementary to each other and independent existence. The classroom practice is still a major part of training, and network training of Computer Assisted Instruction and training test take auxiliary and supporting effect, which provides a diversified training environment for students' independent learning, cooperative learning and explorative learning.

5.5 Strengthening Teachers' Professional Training and Improving Teachers' Information Technology Literacy

Strengthening the cultivation of physical education teachers' information technology application ability makes the PE teachers operate information technology skillfully and grasp the latest development of information technology [8]. In general, there are four ways to improve PE teachers' information technology literacy: First, it is to employ our experts to cultivate PE teachers, which can make full use of our resources, reduce the training costs and improve the efficiency of training; Second, it is to elect physical education teachers for outside training, which can expand their horizons, make them learn more and more frontier sports information technology; Third, it refers to that physical education teachers learn and practice by themselves, and master the latest sports information technology to meet the requirement of era development; Four, it focuses on cultivating the PE teachers who have information technology specialty to further improve their operation ability of information technology knowledge and skills, and promote the improvement of modern information technology level of whole physical education teachers.

5.6 Strengthening the Hardware Investment to Offer Better Service for the Sports Training

Computer Assisted Instruction network training needs computers, projectors, video camera, audio and other multimedia equipments, however, most of these hardware devices are installed in the fixed training places. Because most parts of basketball training are doing in sports building. If the shooting and broadcasting system of training situation is added in the sports halls, and shoot the real situations that students learn sports skills, and then play them in the big screen of sports building through the videos' real-time collection, generation and transmission system to get the real-time feedback. And then according to the feedback, students can constantly improve their sports skills, so that the training effect can be enhanced.

6. Analysis on Test Result of Sports Tactical Paired with Sample *T*

The analysis of variance for single factor must be under the premise of the test results with sample *t*, in order to further determine the specific source of discrepancy, it should further test the validation of the paired sample *t*. The first thing is to test the data with homogeneity of variance, the testing principle and method for homogeneity of variance is the same with the regional press tactical. Testing result of homogeneity of variances is as follows:

Table 1. Test of Homogeneity of Variances

	Levene Statistic	Df1	Df2	Sig.
Defensive morale	11.279	1	37	.002
Defensive movement	.354	1	37	.553
Defensive action	2.973	1	37	.092
Defensive effect	.248	1	37	.621
Position selection	1.741	1	37	.194
Task with purpose	3.802	1	37	.058
Running routes	1.971	1	37	.167
Coordination	1.963	1	37	.168

From the above table, we can see, besides defense morale, the other seven statistics are required to meet the conditions of the analysis of variance, which can be carried on with the analysis of variance.

Among the statistical results, the statistic items that are closely related with the advantages of multimedia are: running routes, defense movement, position selection, task with purpose and coordination. The results of t test of these five items are significantly different. Besides the selection of defensive position is significantly different, the difference of the other four items is also very outstanding. The advantages of multimedia animation method lie in the clear expression of the tactical route and tactical, which can have straightforward expression of tactical contents and requirements. And the advantages can be reflected in tactical assessment for the central area.

There are eight tactical test statistics originally, since defensive morale cannot satisfy the condition of homogeneity of variance, at the end of the experiment, the sample content cannot be adjusted, which can only meet the other seven tactical statistics with the analysis of test conditions of single factor variance analysis. We can see from Table.1, which shows the statistical analysis, among the seven tactical test statistics, the analysis of the three groups, namely, defensive effect, running routes and coordination had no significant difference in statistics. While the analysis of variance results of defensive movement, task with defensive purpose had significant differences. Besides, analysis of variance results of defensive action and position selection had very significant difference. The analysis of variance results of single factor is the same with the result of the paired sample *t*.

7. Conclusion

The advantages of multimedia lie in expressing the process, method and steps of the tactical coordination clearly. At the same time, the corresponding running route and defensive purpose is clear and coherent, which can make students grasp the formation of macro and overall tactical in a short period of time. Although the actual tactical performance of students at this stage may not be up to the requirements of training task, they have formed a rational understanding about the tactical. The shortcomings is existed for them that their understanding and knowledge of tactical cannot be trained into the actual tactical skills; some of the details of the process for implementing the strategy cannot be well grasped, but with practice, most of the students have better learning effects, and the statistics analysis of the tactical evaluation results also confirmed this point.

Acknowledgement

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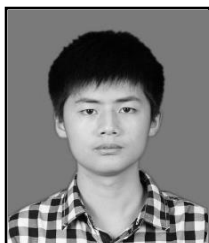
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