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Application research of internet multimedia technology in the teaching of table tennis difficult movement skills

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Abstract
Multimedia technology teaching is an innovative complement to traditional table tennis teaching methods. For teachers, not only can they enrich teaching methods and teaching methods, but also improve the quality of teaching; For students, it is beneficial to stimulate students' interest and enthusiasm, play the main role of students in the teaching process, can help and accelerate the students to establish correct technical movements, and effectively improve motor skills. This paper combines the actual teaching situation of college table tennis and dialectically absorbs the research results of multimedia teaching that existed in the past. Research methods such as the literature method, the teaching experiment method, the questionnaire survey method, the mathematical and unified method and the logic analysis method. Under the basic theory of multimedia technology, the teaching courseware for the difficult action skills of table tennis was designed. The effect of expert animation demonstration under the courseware of multimedia technology on improving the skill acquisition of the soldiers was also discussed. Using courseware and expert animation demonstration to analyse and discuss the data learning results of table tennis learners' self-learning ability, action representation and technical movements, in order to understand the auxiliary role of multimedia courseware teaching and the advantages of multimedia courseware teaching mode. Hoping this study can make the teaching class of table tennis more colorful through the sub-study, stimulate students' interest in learning, and help the orderly development of teaching activities.

Keywords Internet multimedia teaching · Table tennis teaching · Highly difficult skills · Auxiliary teaching

1 Introduction

Internet multimedia technology is a product of the continuous development of modern science and technology, and has been widely used in various fields of society. The application of

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Internet multimedia technology has greatly promoted the development of all walks of life. In recent years, Internet multimedia technology has gradually become popular in the teaching of various subjects. The application of Internet multimedia technology in the course teaching can present more vivid and vivid teaching content to the students, help students to understand the teaching content more deeply and comprehensively, stimulate students' interest in learning, and improve the efficiency of teaching and the quality of teaching [1].

Internet multimedia technology mainly has functions such as image, audio and video, especially the late start of video technology, which provides reliable conditions for wider application of Internet multimedia. Video technology connects computers, networks, televisions, etc., thus providing favortconditions for the better completion of physical education [22]. Of course, in terms of Internet multimedia teaching in various schools, some computers and information technologies have not been widely used. I believe that in the near future, Internet multimedia technology will be more widely used in physical education. Internet multimedia technology can integrate pictures, graphics, images, texts, sounds, animations, etc. into a teaching courseware, and the image is realistically presented to students. So that students can get the most vivid understanding of both visual and auditory [5]. This not only improves the teaching effect, but also effectively applies the Internet multimedia teaching activities in table tennis teaching, can also regulate the action technology of table tennis, stimulate students' interest in learning, and cultivate students' sports literacy.

However, due to the influence of the traditional test-oriented education concept, physical education teachers are mainly based on their own demonstrations in the table tennis classroom teaching, and the teaching methods supplemented by student observation and imitation exercises are the main methods. Although the students have enough time for table tennis exercise, the students do not have much control over the table tennis skills and tactics, and the coordination of movement and the awareness of offense and defence cannot be achieved [8]. Therefore, this requires the use of teaching methods that can be intuitively understood by students to solve the traditional teaching problems of table tennis. It can be seen that table tennis teaching urgently needs the support of Internet multimedia technology. At the same time, some schools have applied Internet multimedia technology in the physical education of table tennis, but the application is relatively simple. Some physical education teachers only played the table tennis competition. Some teachers were too simple in the courseware production, and even just copied the knowledge on the books, and did not fully utilize the Internet multimedia technology [18]. The use of Internet multimedia technology in table tennis teaching is not simply a matter of letting students watch some courseware [13]. It is also necessary for students to compare the various action points provided by Internet multimedia technology, attack and defence essentials for practice. That is to enable students to realize Internet multimedia teaching on the basis of watching, learning and practicing. However, many physical education teachers use the Internet multimedia technology to teach table tennis. They only let students watch the video of courseware and some competitions. They simply do not record their own table tennis moves. Through the Internet multimedia technology for analysis and research, to find out where those places are not in place, and thus correct, the courseware Internet multimedia technology lacks practical test in the application of table tennis teaching [15].

Therefore, in order to make the Internet multimedia technology better applied in the teaching of table tennis, it is necessary to start from the understanding of the importance of improving the multimedia technology of the Internet, strengthen the education and training of the physical multimedia technology of physical education teachers, and also the multimedia technology of the Internet. Scientific assessment of the use of table tennis teaching [3]. This paper combines

the actuality of table tennis teaching in colleges and universities, dialectically absorbs the research results of Internet multimedia teaching that existed in the past, and adopts research methods such as literature data method, teaching experiment method, questionnaire survey method, mathematical and unified method and logic analysis method. Under the basic theory of Internet multimedia technology, the teaching courseware for the difficult action skills of table tennis was designed [16]. The effect of expert animation demonstration under the courseware of Internet multimedia technology on improving the skill acquisition of the soldiers was also discussed. Using courseware and expert animation to analyse and discuss the data learning results of table tennis learners' self-learning ability, action representation and technical movements, to understand the auxiliary role of Internet multimedia courseware teaching and the advantages of Internet multimedia courseware teaching mode. Hoping that through the substudy, the teaching classroom of table tennis will be more colorful, and the students' interest in learning will be stimulated, which will help the orderly development of teaching activities [17].

2 Related work in table tennis teaching in the internet multimedia technology

In the article "Design and Practice of the Teaching Mode of "Flip Classroom" Based on Micro-Class", Lin E C H believe that MOOC development should be based on IT technology. While the IT technology is constantly developing, the social, scientific and convenience of MOOC classroom teaching is becoming more and more obvious, which has a promoting effect on China's future higher education revolution [26].

Buchanan A M's research in the application of GIF animation in table tennis teaching shows that the teaching method of GIF animation can stimulate students' thinking, mobilize students' enthusiasm for learning, help students quickly form or correct action representations, and establish correct technical dynamics [2].

And related research abroad, MunivranaG, pointed out that the emergence of Internet multimedia in the development of the tsunami, swept the world, is an unprecedented impact on the world's university education, directly ushered in the era of online education [11]. Antonio Fini is studying Internet multimedia for college education. From the perspective of students using network technology, it analyses which teaching technologies can contribute to the development of Internet multimedia classrooms. In the empirical investigation, he found that the quality of Internet multimedia classroom teaching is mainly related to the students' positive or negative use of network tools and management skills [10]. At the same time, the quality of the classroom teaching is also limited by factors such as time.

3 The application effect, positive influence and role of internet multimedia in table tennis teaching

In China, table tennis has a good mass base. With the continuous enrichment and improvement of college table tennis teaching resources, table tennis has become one of the popular choices for college sports independent elective courses. The application effect of internet multimedia in table tennis teaching is shown in Table 1.

At present, with the continuous improvement of the level of Internet multimedia technology, it has provided very strong support and help for college table tennis teaching.

Table 1 Application effect of internet multimedia in table tennis teaching

Internet multimedia teaching can be integrated into various disciplines of college table tennis teaching	In all kinds of disciplines of college table tennis teaching, we should fully consider the characteristics of students themselves, use advanced science and technology, and re-edit the original textbooks of various subjects.
Internet multimedia teaching strengthens the interpretation of difficult movements	By taking advantage of Internet multimedia, teachers bring many high-level and difficult table tennis competition videos to the classroom, allowing students to observe, research and imitate the high-level movements of high-level players, and further strengthen their understanding of skills and tactics. Teachers should reasonably adopt certain means to lead students to repeatedly review some difficult movements in the table tennis competition and deepen their understanding.

Undoubtedly, the introduction of Internet multimedia technology has brought new opportunities and challenges to college table tennis teaching. This study mainly studies the understanding and understanding of the positive impact of Internet multimedia teaching applications from the three aspects of Table 2 [19].

Under the premise of affirming the application effect of Internet multimedia teaching, we analyze and expound the positive impact of Internet multimedia teaching application in detail, including the points mentioned in Table 3 [7]:

4 Basic principles and tactics research of table tennis teaching courseware design based on internet multimedia

Aiming at the characteristics and general rules of the physical education majors in ordinary colleges and universities to learn and master the sports technology, the vivid selection of video and technical pictures in the selection of materials, give full play to the role of the Internet multimedia combination. The development of courseware is closely integrated with the sports reform, taking the student's learning process as the starting point and destination [21]. According to the idea of making table tennis internet multimedia courseware for public physical education in ordinary colleges and universities, the table tennis internet multimedia courseware is produced (see Fig. 1 for the specific process).

Figure 2 is a framework for the National Table Tennis Women's Team to prepare for the Internet multimedia tactics analysis method for the 2018 London Olympic Games and the 2018 World Table Tennis Championships. It can be roughly divided into three parts. The first part is the title, opponent's technical tactics and psychological characteristics and typical video clips, mainly the coaches and athletes have an overall concept and understanding of the opponents to be analyzed. The second part is the core content of Internet multimedia technology and tactics analysis [11]. According to the characteristics of the technical and tactical analysis of table tennis matches, it is divided into the analysis of the opponent's serve and attack, the analysis of the attack and the attack and the analysis of the tactics. The third part is a summary of the game and proposes corresponding competition recommendations. The double-play game technical and tactical Internet multimedia analysis method (Fig. 3) is similar to singles.

Table 2 The positive impact of Internet multimedia on the application of table tennis teaching

Internet multimedia teaching performance techniques and forms rich	Teachers use Internet multimedia to assist teaching, which has a certain positive impact on the related aspects of college table tennis teaching. Including: the teaching structure of table tennis, teaching methods and teaching methods, etc.
Internet multimedia teaching spreads fast and the amount of information dissemination is large.	In the course of college table tennis teaching, teachers should keep abreast of the timing and methods of using Internet multimedia and reasonably carry out relevant teaching work. Taking into account the characteristics of each student, the teacher makes full use of the existing network conditions to continuously strengthen individual teaching, continuously optimize the knowledge structure of students, and continuously expand the information volume of table tennis teaching.
Internet multimedia teaching can be free from space and time constraints	There are many unexpected situations in the training, competition and teaching of table tennis teaching in colleges and universities, which need to be further processed and resolved. Students should always be calm and quickly search for the essentials of the difficult movements of table tennis in the classroom videos.

However, since the doubles are two players cross-hitting, and the importance of receiving the ball in the doubles is more obvious than the singles, the second part of the doubles is the analysis of the opponent A receiving the ball, the opponent B receiving the ball, and the opponent A. Analysis of the attacking and attacking wheel, analysis of the attacking and attacking of the opponent B, and analysis of the matching techniques and tactics [11].

Mathematical model using mathematical statistics, using Microsoft Excel and SPSS 19.0 statistical software, combined with statistical methods and basic principles Seeking, statistics, calculation and analysis of relevant data obtained before and after the

Table 3 The role of Internet multimedia in the application of table tennis teaching

From dynamic to static	Teachers use Internet multimedia tools to help students deeply understand the practical procedures of this style of play. Under the premise of meeting certain conditions, Internet multimedia technology can reasonably teach intuitive teaching, which can help students deeply feel the essentials and essence of some difficult table tennis technical movements.
Reproduce the instant picture	To a certain extent, teachers use Internet multimedia technology to repeatedly replay and intercept video recordings of high-level athletes in table tennis competitions. This is conducive to students to deepen the impression of difficult table tennis technology, is conducive to students to find their own weak links, and through their own efforts to overcome defects, is conducive to help students further standardization and standardization of table tennis technology.
Improve students' self-learning ability	Only by giving full play to the functions and functions of Internet multimedia technology can we further ensure that students will replace active learning with the original passive learning, in order to greatly improve students' self-learning ability, and further optimize the effect of college table tennis teaching.

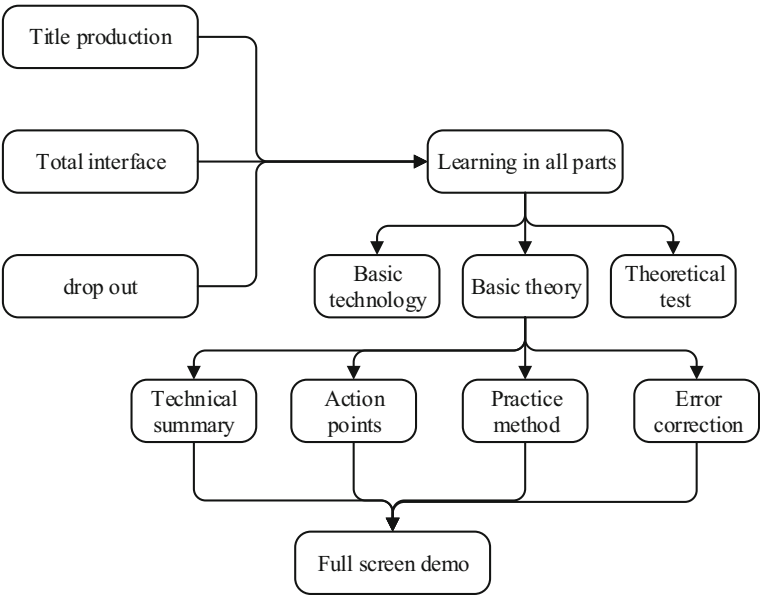

Fig. 1 The specific structure of the production of public multimedia table tennis Internet multimedia courseware in colleges and universities

experiment. Average number of standards "Poor" indicates that statistical analysis is performed using an independent sample t test. The statistical result PG0.0_5 is significant. Sexual differences, PG0.01 was a very significant difference, $P > 0.05$ was no significant difference.

The logical structure design is to transform the conceptual structure into a data model supported by a DBMS, and based on the database normalization theory, optimize it to form the global logical structure of the database and the local logical structure of each user. E-R map to the off The transformation principles and methods of the system model mainly include

1) conversion of one entity type into a relational model;
2) a many-to-many association Is converted into a relational schema in which the code of each entity connected to the entity and the attributes of the association itself are converted into relationships Attribute, and the code of the relationship is a combination of each entity code:
3) A one-to-many relationship can be converted into an independent relationship model The formula can also be merged with the multi-end correspondence mode. If converted to an independent relationship model, each connected to the association The code of the entity and the attributes of the contact itself are converted into attributes of the relationship, and the code of the relationship is the code of the multi-end entity. According to these principles and methods, in the management of action video information and the use of system-related functional modules by learners, The relationship model formed is: Action video (action number, executor number 1, executor number 2, the ping-pong ball technique used, the mathematical model is:

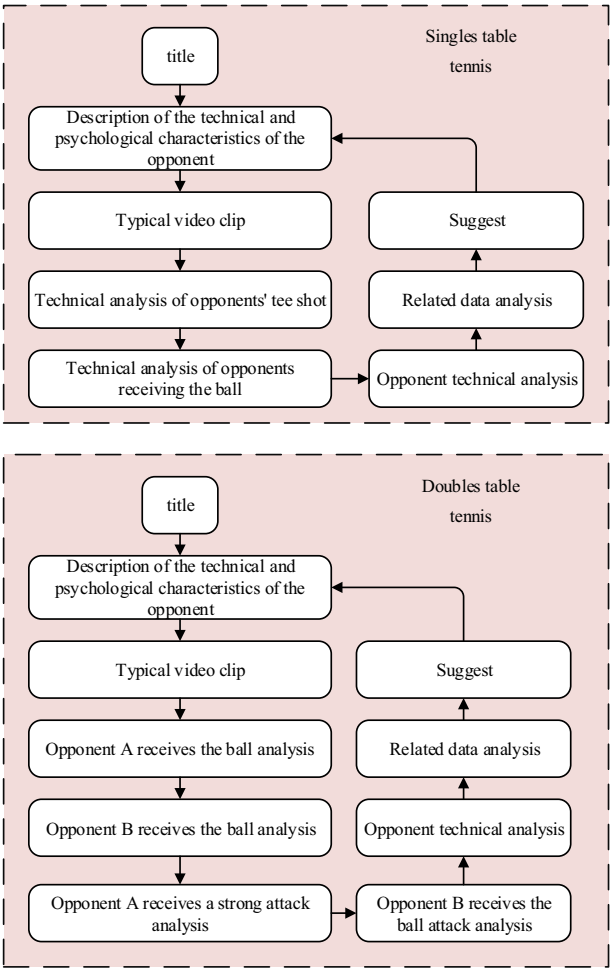

Fig. 2 The framework of the national table tennis women's team preparing for the Olympics Internet multimedia technology and tactics analysis

User (user ID, username, password, category, group number).

Learner grouping (grouping number, description).

System function module (module number, name, main features, creation time).

5 Research objects and methods

5.1 Research object

In this study, 20 students from the physical education major of Xi'an Institute of Physical Education were selected as the research object, and they were divided into two groups: experimental group and control group. A comparative experiment on the multimedia teaching of table tennis Internet was conducted for two groups of students, in order to explore the influence of the teaching method based on computer Internet multimedia on the teaching quality of college table tennis.

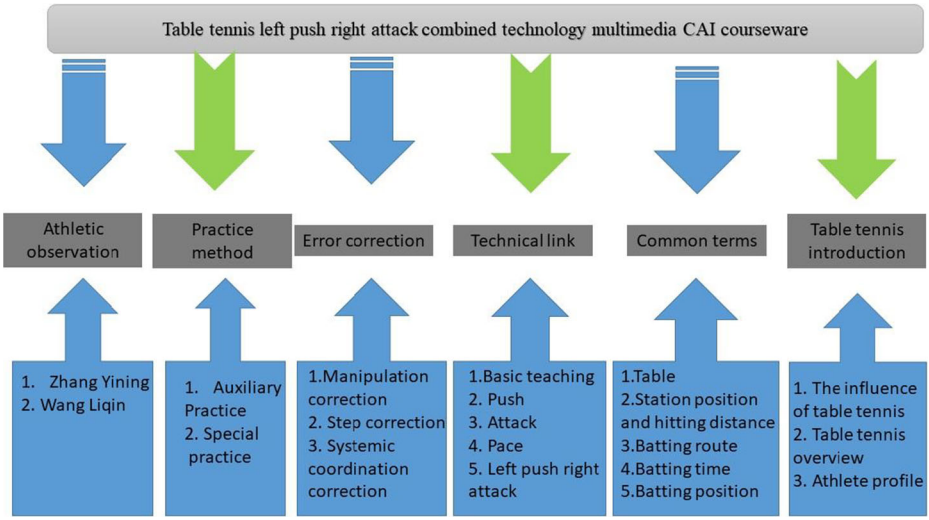

Fig. 3 Schematic diagram of the script frame structure of the high-difficulty action of table tennis (such as left-to-right attack) combined with technical courseware

5.2 Research methods

The research methods of this study are shown in Table 4.

6 Courseware design of table tennis difficult skill teaching under internet multimedia technology

6.1 Learner characteristics analysis and courseware needs analysis

Table tennis difficult action (such as left push right attack) Internet multimedia courseware is mainly provided to the table tennis promotion class students in the table tennis technical class to assist in teaching use. Teachers can conduct teaching demonstrations of Internet multimedia courseware in the classroom, and students can self-learn through courseware. In the questionnaire survey of students, students have been exposed to Internet multimedia teaching methods, mainly in the theoretical class, the main teaching methods are slides and videos. After watching, students feel more vivid and willing to teach in the teaching of sports technology courses. Most of the students in this courseware have a relatively professional understanding of the theoretical knowledge and skills of table tennis [25]. Therefore, this study teaches the difficult skill techniques of table tennis step by step in the design of Internet multimedia courseware. The content of the functional area in the courseware is designed in the form of buttons to facilitate student identification.

6.2 Writing of internet multimedia courseware scripts

After completing the structural analysis of the Internet multimedia courseware, an effective method must be taken to describe the results of the structural design stage,

Table 4 Research methods of this study

Research method	Implementation process
Literature method	This research involves the multimedia teaching of the Internet and the teaching of difficult skills in table tennis. Therefore, many viewpoints can be drawn from various academic journals.
Questionnaire	The pre-test test and the post-test test questionnaire were used to assist the study. The pre-experimental test mainly understands the students' cognition of the difficult action skills of table tennis and the students' interest in learning. The post-experimental test questionnaire is to test the students' learning performance under the Internet-based multimedia teaching mode.
System design method	Based on the theory and method of table tennis teaching system, this study has carried out the overall design of the high-difficult skill technical teaching mode of table tennis, thus optimizing the overall teaching process and improving the teaching quality.
Educational experiment	In this study, the teaching of difficult skills in table tennis was taken as an experimental project. Under the same teaching content, different teaching forms were used for the actual group and the control group. The experimental group used the Internet multimedia technology to teach, and the control group used the traditional The teaching form is taught (mainly based on teacher explanations).
Mathematical statistics	This study used SPSS 22.0 software to perform statistical analysis on the data. The basic technical conditions of the subjects were expressed as mean ± standard deviation. Normal distribution test was performed on the data. In the case where the data conformed to the normal distribution, the intra-group comparison was performed using the paired sample T test, and the comparison between groups was performed using the independent sample T test. When $P < 0.05$, the difference was considered statistically significant;When $P < 0.01$, the difference was considered to be statistically very significant.

so as to design an Internet multimedia courseware that meets the requirements. The tool that describes the results of the Internet multimedia courseware design phase is the script. Making scripts is the direct basis for Internet multimedia developers to produce Internet multimedia courseware [9]. Script is the core and main basis of courseware production, and it is the embodiment of the content design of the teaching content and the design content of the interactive interface. The courseware in this study is based on the difficult movements in table tennis (such as left-handed right-attack) as the research object. The schematic diagram of the courseware script structure is shown in Fig. 3.

6.3 Material preparation and production of internet multimedia courseware

The research and development of the table tennis difficult action (such as left push right attack) combined with the technical Internet multimedia courseware material preparation and production, mainly involves the preparation and production of text material, image, animation and other materials preparation and production and video material Preparation and production [14]. See Table 5 for details.

Table 5 Table tennis difficult action (such as left push right attack) combined with technical Internet multimedia courseware material preparation and production

Material classification	Content
Text material	The production of text material is mainly the choice of font, font size and color. The font, font size, and color have been adjusted accordingly so that the learner can clearly distinguish the primary and secondary content of the courseware.
Images, animations, etc.	Find a variety of table tennis high-difficulty action skills resource network and courseware production network to find the image you need.
Video material	Video is a true record of reality, has a strong appeal, is an intuitive sense of technical movements.
Audio material	Sound is the way to convey teaching information and mobilize the learner's auditory organs to enable learners to accept knowledge. The sound is used appropriately in the courseware, which will make the courseware full of energy.

6.4 Internet multimedia courseware content and design

6.4.1 Content and context design

If students can have a pleasant emotional experience during the physical education process and actively participate in teaching activities, our teaching will achieve twice the result with half the effort. At the same time, students' intelligence and thinking will be fully opened in a relaxed and pleasant atmosphere. Internet multimedia courseware is a kind of courseware that combines text, sound, graphics, video, animation, video and other media that can stimulate students' brain emotions. Then the content of the courseware is required to be expressed effectively and scientifically, so that the students have a higher interest and desire for knowledge based on the image perception. This table tennis difficult action (such as left push right attack) combined with technical Internet multimedia courseware is divided into six modules of the content table tennis profile. Including common terms, technical links, error correction, practice methods, and competitive observation. Each module is divided into small sections, in the form of pictures and texts, dynamic and static, in a sequential, step-by-step presentation. In the "technical link" module is the most important module in the design of the content of the courseware in the difficult action of table tennis (such as left push right attack). Therefore, this courseware strives to match the appropriate colors to attract students' attention and make them exciting and enjoyable. Part of the courseware content is shown in Fig. 4 [24].

In Fig. 4, "error correction" is an important part of improving technical accuracy. It is divided into pushing the ball, attacking the ball and pushing the right attack. The pain is all down. In order to improve the learner's physical and technical skills, the "Practice Method" module is divided into the auxiliary exercise method and the special practice method. The "Competition Watch" module provides Zhang Yining's personal profile and video of the competition to stimulate students' interest and fighting spirit.

6.4.2 Courseware packaging and debugging under internet multimedia technology

After the courseware is created, debugged, and modified, it is packaged with Authorware7.0 to generate the application file ending with exe. Use on multiple computers to check for stability and reliability. After normal operation, the experts who invited the table tennis party and the

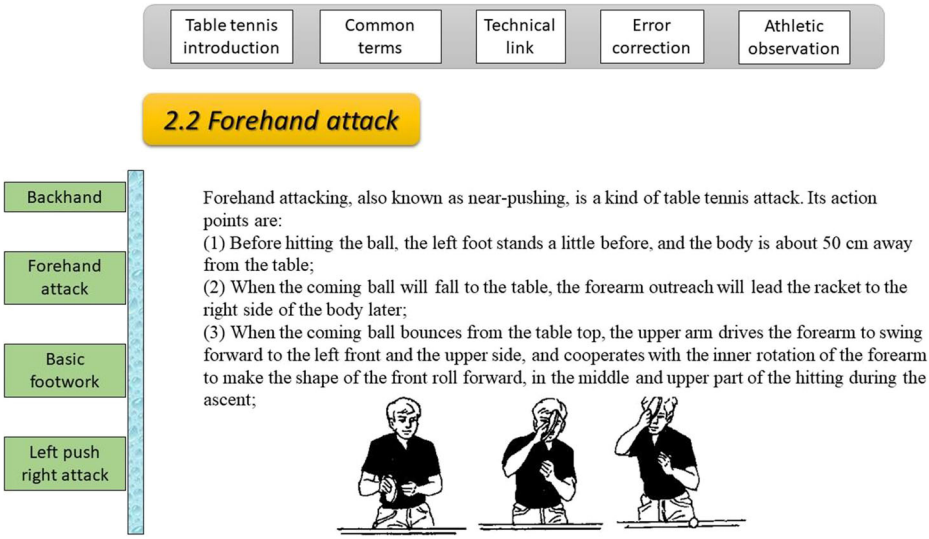

Fig. 4 Part of the courseware content

experts of the School of Computer Science and Education Software evaluated the production of the courseware [20].

7 Expert animation demonstration based on internet multimedia technology to improve the acquisition of table tennis difficult skill skills

The method of playing video through the Internet multimedia technology to demonstrate the action makes the high-altitude sports skill of the arsenal can observe the complete technical movement, and has a good perceptual understanding of the execution speed of the action. Teaching videos on many video sites (such as Youku) can be used for action demonstrations. The video method helps the learner to imitate the skills of the ball. In the process of teaching table tennis difficult game skills, the feedback information of students is very important. The feedback can reflect the learner's implementation of the specific action, showing to the learner in detail which action is wrong, or which aspect should be improved. Moreover, feedback also helps learners understand the gap between their current completion of actions and established goals, and encourages learners to work toward a goal. For example, the coach said to the soldiers of the soldiers, "You have not fast enough to receive the arm in your previous action"; Visual feedback is a video that allows learners to watch their own actions, which helps to find their own unwanted or wrong actions. Some coaches use feedback in the form of photos or slides. These methods allow learners to observe the spatial characteristics of their actions (such as the posture of the body, the trajectory of the action, the range of the action, the magnitude of the action, the orientation of the action, etc.) [23]. However, the learner cannot observe the temporal characteristics of the execution of the action (such as the duration, rate, sequence, and rhythm of the action). Therefore, it can be seen from the above analysis that there are many shortcomings in the commonly used demonstration methods and feedback

methods in the high-altitude sports skill learning of the corps, and the Internet multimedia technology can make up for the shortcomings of these methods. Insufficient demonstration and feedback techniques in the study of difficult skills in integrated sports and the development of existing technologies and streaming media technologies. Theoretically explore the relationship between expert animation demonstration and video feedback under the Internet multimedia technology and the effect of military ball skill acquisition [12]. The theoretical framework of the expert animation demonstration and video feedback under the Internet multimedia technology constructed by this study affects the effect of the skill acquisition of the soldier's ball, as shown in Fig. 5.In this theoretical framework, the expert animation demonstration and video feedback under the Internet multimedia technology can influence the high-altitude action skill acquisition effect of the arsenal by internal factors and external factors [6].

7.1 Pretreatment process

In order to obtain high-quality technical action animation, the platform construction adopts the following method to preprocess the related video. First, download high-definition table tennis difficult skill skills teaching videos or actual game videos from related websites. Secondly, these video files are converted into video formats (such as AVI, MPEG, etc.) that can be processed by GIF software through a series of software tools. Then separate the motion video clips required for the motor skills demonstration and finally convert these video clips into GIF files [4]. The main steps of animation preprocessing include two as shown in Table 6:

7.2 Motion decomposition animation

Because the execution speed of the ball is very fast, it is difficult for the students who need to improve the table tennis skills to observe the details of the technically difficult movements.

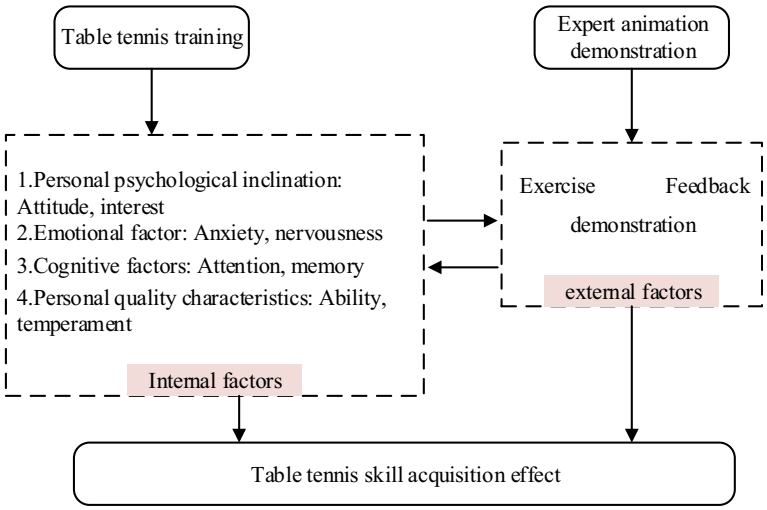

Fig. 5 The theoretical framework of the expert demonstration of Internet multimedia technology affecting the acquisition of high-altitude action skills of soldiers

Table 6 The main steps of animation preprocessing in table tennis difficult action skills under Internet multimedia technology

Step	Step points
Convert video files into target format (such as AVI, MPEG, etc.) files, and segment the video files.	When intercepting a segment, the value of the time interval (the end time minus the value of the start time) needs to be appropriate to ensure that a normal GIF file can be obtained.
Convert the target file to a GIF file.	In order to ensure that the technical actions of the local quality are correctly set for parameters such as "color" and "jitter value", the number of colors can be set to 256, and the jitter value can be set to 100%.

Therefore, the use of Internet multimedia animation to control the playback of high-motion, the individual technical actions are broken down into several components. For example, the basic structure of a soldier's forehand attack includes three parts: tempo, hitting and restoring. The purpose of the motion decomposition animation is to allow the motor skills learner to observe the action structure of the expert's individual technical actions. The action decomposition animation effect realized by the Internet multimedia technology is shown in Fig. 6.The implementation of the action decomposition animation is as follows:

Step 1: Import the image of the expert's difficult action execution // Each image must be a keyframe
Step 2: Pause the animation to play // stop the animation at the first frame, waiting for the user's operation
Step 3: For $i = 1$ *to* n// A single action consists of n parts
If the i-th part is not over,
Then move to the next keyframe.
Else pauses animation playback.
EndFor

Fig. 6 Demonstration technique for the decomposition of difficult action skills of table tennis under the Internet multimedia technology

Fig. 7 Slow motion animation of table tennis difficult action skills under Internet multimedia technology

Step 4: For $i = 1$ *to* n// Add a user interaction button, write a response function, play the animation to the target keyframe, and add a listener for the user's mouse event.
EndFor
Step 5: End

7.3 Slow motion animation

The normal action execution speed is generally very fast. In order to facilitate the learner's observation, the slow motion playback effect can be realized through code changes. The slow motion animation effect realized by Internet multimedia technology is shown in Fig. 7.The main implementation process of slow motion animation is as follows.

Step 1: Import images of experts performing actions // Each image must be a key post
Step 2: Pause the animation to play // Stop the animation at the first stop, waiting for the user's operation
Step 3: Step3:Add a button for the user to reduce the animation playback speed
Write out the response function.
If, the frequency is >5, Then is the frequency = frame rate − 5 / / the user clicks the button once, the frame rate is reduced by 5.
Add a listener for user mouse events
Step 4: Add a button for the user to speed up the animation playback
Write out the response function.
If, frame rate < 25, Then, frame rate = frame rate + 5 / / user click the button once, the post frequency plus 5.
Add a listener for user mouse events
Step 5: Add a button for the user to return to the normal playback speed
Write out the response function.

Table 7 Comparison of student test group and control group under internet multimedia technology

	Control group(X ± S)	Test group(X ± S)	T	P
Cross mode table in 30s (times)	41.56 ± 3.33	46.56 ± 4.18	2.24	0.089
Backhand push test in 1 min (a)	65.45 ± 4.78	69.76 ± 3.11	3.26	0.025
Forehand attack in 1 min (a)	23.67 ± 3.90	28.78 ± 2.29	1.56	0.036
Left push right attack in 1 min(a)	11.56 ± 1.56	14.47 ± 2.56	2.68	0.067
Forehand spins the ball (times)	4.87 ± 0.88	5.68 ± 0.37	0.87	0.054
Backhand croquet in 1 min(a)	34.12 ± 2.21	37.72 ± 1.93	4.45	0.021

Set the mechanical frequency to the frequency of the video playback.
Add a listener for user mouse events.
End

8 Test results and analysis

8.1 Analysis of self-learning ability of students in experimental group and control group

Students' self-learning ability helps to improve the efficiency of classroom learning. Students actively take the initiative before class, and participate in the classroom enthusiastically. After class, students can check and fill in the gaps in a timely manner, giving full play to the enthusiasm and initiative of the students. At the same time, the degree of active participation of students is also a measure of students' interest in learning table tennis. Therefore, it is extremely important to cultivate students' self-learning ability. When the experimental group and the control group are in the middle of the general course, in order to better discover the effect of teaching on the difficult action skills of table tennis based on Internet multimedia technology. At this time, an assessment was conducted in the case where all the difficult techniques were learned, in order to discover the different methods of the courseware and expert demonstration based on the theory of Internet multimedia technology design and the traditional classroom. Table 7 below is the relevant data of the assessment test.

It can be seen from Table 7 that the average number of cross-touch tables in the control group and the experimental group was 41.56 and 46.56 in the middle of the experiment, and the average difference between the two was significantly opened. In addition, since $P = 0.089$, the two sets of data are significantly different. Within one minute, the average number of backhand pushes by the control group and the

Table 8 Comparison of action images between experimental group and control group ($N = 20$)

	Right	More correct	General	Incorrect
Control group	20.0%	30.0%	20.0%	0.0%
Test group	5.0%	10.0%	5.0%	10.0%

Table 9 Comparison of student's public secondary regulations technical test results ($N = 46$)

	Right	More correct	General	Incorrect
First technical test Grade	6.4781 + −0.6310	6.4351 + −0.5734	0.245	0.808 > 0.05
Second technical test Grade	7.8701 + −0.435 3	8.1651 + −0.3406	−2.565	0.014 < 0.05
Final grade	84.4351 + −3.1705	86.4781 + −2.7818	−2.323	0.025 < 0.05

The simulation diagram is as follows:

experimental group was 65.45 and 69.76;In the test, the control group basically failed to push three to five rounds, and the experimental group in this stage pushed in five to eight rounds. According to $P = 0.025$, it is known that there is a significant difference in the backhand performance of the two groups of students. Within one minute, the average number of forehand attacks in the control and experimental groups was 23.67 and 28.78, $P = 0.036$, and the difference was significant. Test the difficult group (such as left-to-right attack) in the experimental group and the control group in one minute. The average number of groups was 14.47 and 11.56. The control group basically failed for three to five rounds, and the experimental group at this stage failed. All in five to eight rounds; Theaverage level of the experimental

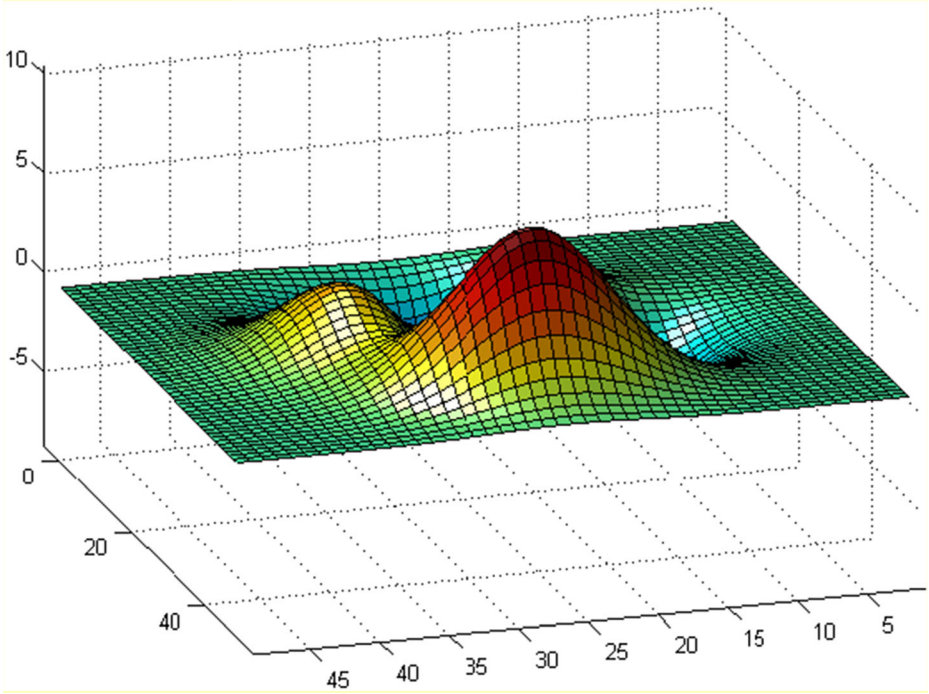

Fig. 8 Verification simulation

group was significantly higher than that of the control group. According to $P = 0.067$, it is known that there is significant difference between the two groups of students.

From this, it can be seen that different students have different ability to accept the knowledge they have learned. The courseware and expert demonstration classroom teaching mode designed under the Internet multimedia technology can make the experimental group students easily accept new knowledge, so that students have the ability to actively discover problems and solve problems;

8.2 Comparison of action appearance and technical action evaluation between experimental group and control group

The performance evaluation of this study is a representation of the students' technical actions on table tennis. The technical action evaluation is the assessment of the correctness of the action when the assessment is completed. See Table 8 for details:

Students' mastery of technical movements is an indicator of their motor skills and is also a measure of One of the important indicators to test the effectiveness of teaching. Based on the technical characteristics and teaching experience of table tennis In summary, we first conduct basic gestures, basic footwork, and arm movements for students. Basic training, then organize students to learn the third set of "two sets of movements Continuously improve and consolidate the basic skills of students in the process of learning, in order to promote students faster and better Hold technical movements. Three technical tests were conducted on the students in the experiment, the first being the first to the second combination, as shown in Table 9;

The reasons may be as follows: First, the students in the experimental group use WeChat to communicate with teachers and peers, do a good job in pre-study work, and know the key points of the new action, and the more serious students will Imitate in advance, so it will be faster to accept new actions in class, and more practice. Second, students will watch their action videos repeatedly after school. This kind of intuitive image stimulation is even better than others. Better, it will arouse their desire to further improve themselves. In order to "make themselves look better", they will carefully watch and imitate the standard video action, so they will be more active and targeted as shown in Fig. 8.

9 Conclusion

Table tennis teaching at the university stage has a completely different meaning from other stages. Compared with a teaching subject, this stage of table tennis teaching tends to strengthen the comprehensive ability of students. In order to achieve the training goal, teachers must use media equipment and technology more actively to help students strengthen their skills and master the technical points, so that students can learn faster and cultivate more excellent table tennis talents. Under the basic theory of Internet multimedia technology, this study designed the teaching courseware for the difficult action skills of table tennis. It also discusses the effect of expert

animation demonstration under the courseware of Internet multimedia technology to improve the skill acquisition of soldiers. Using the courseware and expert animation demonstration, the data results of the table tennis learners' self-learning ability, action representation and technical actions are analyzed and discussed. The results showed that the self-learning ability and movement appearance and technical movements of the experimental group were significantly improved compared with the control group taught in the traditional way.

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