Research on the Relationship Between Implicit Learning and Tennis Forehand Skill Acquisition Based on Flipped Classroom

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ABSTRACT

Background: The flipped classroom teaching mode has become the mainstream of modern education, and how to exercise the flipped classroom has become the research direction of scholars.

Methods: Using the "single-blind" group teaching experiment method, students from Xinxiang Medical College were used as experimental subjects to explore and reveal the internal relationship between the appearance and technical specifications of tennis forehand, as well as students' mastery of tennis forehand.

Results: The teaching experiments show that implicit learning can help students form a clear and correct representation of tennis forehand, establish a correct concept of tennis forehand, and enable students to master standard tennis forehand.

Conclusion: The application of implicit learning in tennis teaching can also effectively cultivate students' interest and motivate in learning tennis, mobilize students' learning enthusiasm and enhance learning confidence.

Keywords: Implicit learning; tennis forehand; flipped classroom; acquisition; relationship

INTRODUCTION

The earliest application of implicit learning to motor skills research was in the study of amnesia patients. Implicit learning positively affects the learning and maintenance of motor skills of amnesia patients. So far, implicit learning has been applied in studying normal people's motor skills acquisition (Ren & Zhang, 2000).

At present, tennis teaching is still based on teaching methods, focusing on the leading role of teachers and emphasizing explicit learning and practice. In the study, only the teacher's teaching is emphasized, whereas the

students' study is ignored, leading to students' slow learning progress and even loss of interest in learning. In tennis teaching, teachers also have simplified and improved teaching methods in recent years, but have focused more on explicit and intuitive imitation exercises, ignoring the influence of tennis action appearance on skill acquisition.

This article attempts to introduce implicit learning methods into tennis teaching through experiments to explore the internal connection between implicit learning and tennis skills acquisition and provide a theoretical reference for enriching tennis teaching theories and methods.

Objective and Methods

Research objective

Considering the students of Xinxiang Medical College as the experimental objects, the relationship between implicit learning and the acquisition of tennis forehand skills is the research subject of this research.

Research Methods

According to needs, read and consult related materials, such as pedagogy, sociology and physical education, organize the data to provide theoretical support for the text.

Questionnaire Survey Method

Design of the Questionnaire

The experimental research and the sports motivation scales are derived from the "Manual for the Evaluation of Sports Science Commonly Used Psychological Scales" (Zhang & Mao, 2004), and both subscales have good reliability and validity indicators.

Recycling of Questionnaires

A total of 48 copies were issued, and 48 copies were recovered, with a recovery rate of 100%, of which 48 were valid questionnaires, with an effective rate of 100%.

Experimental Method

According to the requirements of the experiment, a "single-blind" experiment method that both the students and the teacher know is adopted. The first round selects small sample experiments to determine the reliability of the experimental design, and the second round conducts large-sample experimental teaching based on the completion of the first round of experiments. Using the experimental and the control groups, under the same basic conditions, the difference in tennis forehand dribbling skills after the end of the course can be seen. The inner connection between implicit learning and tennis forehand technique will also be explored.

Mathematical Statistics

Using SPSS11.5 statistical software, the effective data obtained from the survey are classified and processed according to the principles and methods of sports statistics and social science survey statistical methods.

Logical Analysis

Applying logical analysis methods, comparative analysis and induction and deductive reasoning of teaching experiment results reveal the logical relationship between implicit learning and volleyball skill acquisition.

Psychometrics

To understand the students' movement level representation, refer to Xu Songgao's simple measurement method on movement representation. Based on the principle of psychological projection and related ink detection methods, combined with the technical characteristics of tennis forehand drive, a measurement tool is designed to formulate scoring standards.

Test Content

Randomly draw a diagram of the tennis forehand technique, decompose the technical actions and arrange the tennis forehand technique in order within one minute. The test aims to explore the students' cognitive level of the technical movements they have learned after teaching.

Test Reliability and Validity

The subjects were subjected to a second test three days after the test to verify the credibility of the test methods and results. Comparing the two test results before and after the inertia test, the correlation coefficient of the two sets of data is 0.72 (according to the 0.5 principle), which indicates that the test results can be used as the basis for statistical analysis.

Experimental Design

Purpose of Experimental Design

It reveals the inner connection between implicit learning and the acquisition of tennis forehand skills and provides

more teaching methods for the teaching of tennis skills.

Experimental Group Design

Total 48 students in the first grade of Xinxiang Medical College are the subjects of the experiment (the students selected are all male due to the limitations of the experimental conditions). Before the experiment, according to the principle of statistics, they were randomly divided into an experimental group and a control group with 10 people in each group. There was no significant difference in indicators between the two groups. Both groups of students have taught by themselves, and the teaching content and progress are consistent.

Experimental Operation Program Design

According to the teaching characteristics of implicit learning and explicit teaching, the progress frame of tennis forehand kick teaching is designed. The operation and implementation procedures are shown in the figure below.

Experimental Procedure

Experimental Group Design

1. Before the start of the experiment, test and investigate the height and physical fitness of the two groups of students. The specific test items are: height, standing long jump and plank support. Use SPSS16.0 to analyse the obtained data to ensure no significant difference between the two groups of students.

2. Use the interest scale (learning) and motivation scale (learning) to test tennis students before teaching, and use SPSS11.0 to analyse the measurement results systematically.

3. Use the psychology scale specially designed for this experiment to measure the students' performance before and after the experiment. Use SPSS11.0 for system analysis of the measurement results.

4. After completing the experimental grouping, use the implicit teaching method for the experimental group students and the traditional teaching method for the control group students.

5. After the experiment is completed, the two groups of students will use the 'double-blind' method to evaluate the performance of the students' tennis forehand dribbling skills and the technical performance of the tennis forehand dribbling skills. The measured data will be systematically analysed using SPSS11.0.

6. At the end of the training, the student's interest in learning and motivation to participate in learning sports are tested through the scale, and the data obtained is analysed using SPSS11.0.

Time	Impose conditions	Purpose
Lesson 1	Watch tennis forehand kick tennis video, multimedia graphic teaching materials and "inner feeling and appearance" discussion.	Preliminary establishment of the appearance of tennis forehand technique.
Lessons 2 and 3	Adopt wall chart teaching, use graphic teaching materials, error correction, discussion and suggestion (language, action and self-suggestion).	Understand the decomposition of tennis forehand strokes and establish a clear representation of the action.
Lessons 4 and 5	Recalling tennis forehand technique moves, error correction discussions, hints and watching the tennis forehand kick match video.	In the study, correct and improve the technique of tennis forehand tick, prevent abnormal appearance and deepen the understanding of movement concept.
Lessons 6 and 7	Multimedia graphic teaching materials, error correction, recall teaching materials, discussion, suggestions and watching tennis forehand kick video game.	Deeply understand the concept of action and form a correct and clear action representation.
Lessons 8 and 9	Free and relaxing environment, discussion, tennis forehand match.	Consolidate a clear presentation of tennis forehand strokes
Lessons 10	Watch your own tennis video and self-suggestion.	Establish a correct and clear movement representation, better grasp the concepts and principles of technical movement and enable students to use tennis forehand technique to achieve automation.

Timing of the Experiment

August 30, 2018–October 30, 2018, at the tennis court of Xinxiang Medical College; teaching tennis forehand kick for a total of 12 hours.

The Effect Index of Tennis Forehand Technique Movement Skills

Consult relevant literature and interviews with experts to determine the effect indicators of this experiment. The final effect index is: tennis forehand technical performance, tennis forehand skill description and sports motivation and interest (Yang, 1991).

Experimental Results and Analysis

Experimental Results

Preliminary Experiment Results and Analysis

It can be seen from Table 1 that, before the experiment, the concomitant probability of the two groups of students in the three basic quality tests of height, standing long jump, and plank support was P ≥ 0.05, which is not a small probability event Therefore, it is believed that the basic conditions of the experimental and the control groups, such as physical fitness before the experiment, did not have a significant difference.

Tables 2 and 3 show that after the experiment, the two groups and students' tennis forehand scores are accompanied by a probability P=0.021<0.05, which is a small probability. Therefore, there is a significant difference in the tennis scores of the two groups of students after the experiment. At the same time, it

can be seen from Table 3 that the average score of tennis forehand in the experimental group is higher than that in the control group. Therefore, we can think that the implicit teaching method s have a significant impact on the learning of tennis forehand skills. A large sample experiment was conducted to compare further the internal connection between implicit learning and the acquisition of tennis forehand skills through experiments.

Formal Experimental Results and Analysis

Data Analysis of the Two Groups of Students Before the Experiment

Before the start of the formal experiment, the three indexes of the two groups of trainees' height, standing long jump and plank support were tested separately, and the data obtained were systematically analysed using SPSS11.0 as shown in the table below:

Table 4 shows that before the experiment, the basic conditions of the two groups of students used an independent sample t-test, and the statistical test showed no significant difference in the basic physical conditions of the two groups of students. Table 5 shows no significant difference in the evaluation of sports appearance, sports interest and sports motivation between the two groups of students.

Data Analysis of the Two Groups of Students After the Experiment

After the experiment, the tennis forehand technique evaluation scores of the two groups of students were tested (other tennis coaches evaluated the scores),

Table 1. Statistics of the basic situation of students before the experiment

Class	Test group	Control group	*t*	*P*
Height	1.7350±0.03655	1.7300±0.03783	0.088	≥0.05
Standing long jump	1.9340±0.02577	1.9325±0.03198	0.642	≥0.05
Plank	25.0231±0.05089	25.0312±0.0683	0.709	≥0.05

Table 2. Statistics of independent samples of tennis forehand technique of the two groups of trainees after the experiment

	Class	No of people	Average value	Standard deviation	Standard error
Tennis forehand technique	Test group	24	78.0000	4.56042	2.09762
	Control group	24	69.8000	4.38178	1.95959

Table 3. The independent sample t-test of tennis forehand technique of the two groups of students after the experiment

| | | Test for homogeneity of variance | | | | | t-test for equal means | | | |
| | | *F*-test test statistics | *F*-tested *P* | Test statistics | df | *P* | Average difference | Standard error | 95% confidence interval difference | |
									Lower bound	Upper bound
Tennis forehand technique	Assuming equal variances	0.117	0.742	2.857	8	0.021	8.20000	2.87054	1.58052	14.81948
	Assuming unequal variances			2.857	7.963	0.021	8.20000	2.87054	1.57520	14.82480

Table 4. Independent sample inspection of trainees' physical fitness before the experiment

	Class	Number of people	Average value	Standard deviation	Standard error
Height	Test group	10	1.5248	0.05010	0.01016
	Control group	10	1.5348	0.04810	0.01079
Standing long jump	Test group	10	1.8786	0.20537	0.03867
	Control group	10	1.8179	0.18530	0.03070
Plank	Test group	10	25.7548	0.84661	0.17578
	Control group	10	25.6079	0.73925	0.15584

Table 5 Significant test of the difference between the two groups of trainees' movement appearance and movement motivation before the experiment

	Test group (N = 24)	Control group (N = 24)	t	P
Motor appearance	65.63±3.31	66.25±2.79	1.12	0.089≥0.05
Sports motivation	13.26±1.48	13.09±2.88	0.36	0.782≥0.05
Participation tendency	8.08±1.43	8.57±1.63	0.43	0.653≥0.05
Avoidance tendency	5.56±2.17	6.35±1.95	1.08	0.059≥0.05

Table 6 Significant test of the difference in tennis forehand technique performance between the two groups of students after the experiment

Project	Group	Average score	*F*-tested *P*	*t*-tested *P*
Tennis forehand score	Test group	72.4483±.88305	0.272≥0.05	0.026<0.05
	Control group	69.2759±1.06546		
Tennis forehand stroke description	Test group	74.3448±0.88679	2.147	0.036>0.05
	Control group	71.3793±1.05911		

and the scores obtained were systematically analysed using SPSS11.0. The results are shown in the following table:

After the experiment, the test results of the tennis forehand technique of the experimental and the control groups were performed by independent sample t-test. Table 6 shows a significant difference in the performance description of the hand stroke.

Analysis and Discussion of the Relationship Between Implicit Learning and Skill Acquisition

Implicit learning can help students form correct and standardized action representations, establish correct action concepts and improve tennis skills.

The implicit reaction is the impression of the stimulus once felt when the sensory perception is absent, while

the appearance is a more complicated psychological phenomenon than the feeling (Huang et al., 2017).

In the experiment, through various implicit teaching methods, such as "suggestive teaching method, multimedia teaching method, discussion and analysis method" and other methods combined with traditional teaching methods, by forming tennis skills and teaching sequence, the systematic implicit learning method is divided into two parts. The learning method is implemented in stages into the traditional teaching method. In the teaching process, students should form correct movement representations in their brains, combined with the coach's demonstration and explanation, so that students can form correct preliminary movement representations. Students should frequently perform representation detections during the learning process, conducive to technical corrections and establish the correct representation to deepen the understanding of the concept of tennis forehand. Beginners will encounter negative and fearful emotions in the learning process of tennis, thereby easily losing interest in learning tennis skills. Using implicit learning methods can stimulate students' learning enthusiasm and enhance the relationship between students and teachers. The communication distance between them makes the students go from fear and resistance to acceptance and love the sport. The teaching method of implicit learning enhances students' interest in learning tennis and their imagination of technical movements, and enables students to realize their advantages and disadvantages, which has played a substantial role in promoting students' mastery of tennis skills.

Implicit learning is conducive to the formation of normative behaviour in students

The teachers let students perform imitation exercises through explanations and demonstrations in the traditional teaching method of tennis, improving the standard level of the teacher's movement skills. In the current tennis teaching and training market, tennis has become more of people's leisure sports due to improved living standards, and many people have also seen the business opportunities in it.. Therefore, most tennis coaches without professional skills appraisal qualifications have emerged in the market. This has led to uneven coaching skills and various movements. Some coaches cannot explain the correct technical actions to the students. Instead, they adopt a teaching method that combines implicit and explicit learning to present

clear and correct actions to students through multimedia and other equipment, decomposition and completeness. Teaching methods such as repetition can make up for the teacher's lack of teaching ability. In this way, students can establish correct representational actions. In the teaching process, teachers can use hints, language, prompts, etc., to assist in teaching so that corrective actions are repeatedly presented in front of students, giving full play to the students' subjective initiative, and rooting in the students' minds for actions. This also promotes the improvement of students' tennis skills.

During tennis learning, the teacher uses multimedia and other teaching aids through demonstrations and explanations so that students have a preliminary understanding of learning tennis forehand technique, and implicit learning can inspire students to establish correct action representations. The muscle movement is more perfect, and he has mastered the tennis forehand technique unconsciously. Implicit learning can have an overall grasp of the strength and rhythm of tennis forehand technique so that tennis forehand technique can be improved and developed. After the unconscious motivation is finalized, students undergo repeated imitation exercises, and their movements will be more vivid and clearer than the original, and more coordinated and coherent. The teaching methods in implicit learning have stimulated the imagination of students and deepened their understanding of movements. In tennis teaching, the teacher used hints, etc., to a great extent to stimulate students' initiative in learning.

Implicit learning can improve students' sports interest, motivation and intelligence

Implicit learning is through changing teaching methods, the teaching environment and traditional technical models, which can easily stimulate students' enthusiasm for learning, enhance their self-confidence and the courage to challenge difficulties, and gradually find a sense of accomplishment in the learning process. Implicit learning can also help students to develop their skills. In the tennis forehand teaching competition held in the ninth class, it was found that the correct behaviour of students before the game can enhance self-confidence and overcome self-negative psychology. Make the most of your skills and tactics in the game. Implicit learning and other methods arouse students' interest in active learning, thereby improving sports motivation, and the increase in sports interest also affects students' sports motivation during exercise.

Implicit learning can promote the growth of teachers' teaching ability

Through the learning theory of implicit learning-related knowledge, we can realize that implicit learning can help students quickly master new technical actions and but also help teachers improve their teaching level. The traditional teaching method is that the teacher explains too much and students blindly imitate the exercises. In the experiment, the teacher first allows the students to observe the learning actions of the teaching video and does not know how to ask the teacher again. This makes the students change their learning attitudes during the learning process. Teachers' teaching thinking will also be changed. Most of the traditional teaching mode uses instillation teaching, and the teacher is the guide in the learning process instead of letting the students passively accept new knowledge, which will only reduce the students' interest in tennis and reduce the teaching effect. Implicit learning integrates teaching content and methods into the teaching process and tries to let students be the masters of the classroom. Teachers can also discover their own shortcomings in the classroom and will actively learn how to solve the problems encountered by students in the classroom.

Conclusions and Recommendations

Conclusion

The teaching combination strategy of implicit learning and explicit learning has been obtained. Through implicit learning, students can form correct representations of motor skills in their minds and establish complete motor concepts to acquire standardized and standard tennis forehand technical action.

Implicit learning is automatic, while explicit learning requires conscious effort to control. Implicit learning is stable and not easily affected by the outside world and other aspects, while explicit learning is affected by age, physical condition and personality. Explicit learning sometimes hinders implicit learning and promotes implicit learning. The learning of any skill is a combination of implicit learning and …' explicit learning and a product of the connection between implicit learning and explicit learning.

Implicit learning can improve students' clarity of movement representation, help students form movement automation dynamic stereotypes, and improve sports skills. Implicit learning can help students increase their interest in learning the sport of tennis forehand, improve learning motivation, enhance self-confidence and overcome fear.

In tennis forehand kicking teaching, the teacher can improve the classroom efficiency through the implicit learning method in the teaching process, make up for the teacher's inability to express clearly in the classroom and also allow students to participate in the classroom actively.

Suggestions

Implicit learning can affect the mastery of students' motor skills. School teachers can add some representational learning and contact methods in ordinary physical education classes so that students' sports representation levels can be improved, improve students' motor skills, and deepen their sports skills and understanding of concepts and principles.

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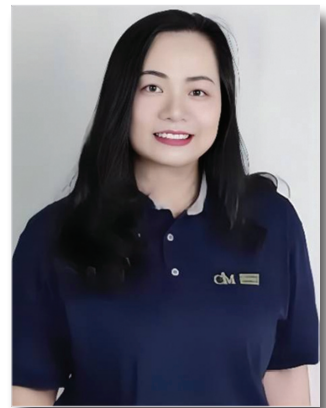
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