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## Experimental study on infiltrating track and field training into tennis training

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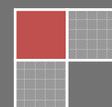
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### ABSTRACT

As comprehensive national power of China improves constantly and economy develops rapidly, industries of China connects to the world gradually; education plays a role of vanguard among all industries,. Through communication with advanced foreign education ideas, people realized that health was a fundamental element which determined the level of living. Physical and health education was conducted and social idea of "Health First" was accepted by the public gradually. Five teaching goals were put forward in college education: sports participation, sports skills, physical health, psychological health and social adjustment. The idea of "exercise and get benefit for the whole life" was set up. It is a subjective rule that physical exercise and track and field training can not be separated. Since students are particularly interested in special sports trainings, it is practical to infiltrate track and field training into tennis training. Present track and field training is not athletic training with track and field competition as its core element; it is a fundamental exercise which relates to special sports training closely. There are reforms and innovations in infiltrating track and field training which is not simple, boring or uninteresting anymore, it is vivid, interesting and popular training for students now. Many students were fond of track and field training without knowing it; some students even became the enthusiasts of track and field sports which will benefit them for a lifetime. Through experimental study on infiltrating track and field training into tennis training, it was proved that track and field training can not only inspire students' interests on physical exercise, but also will promote ability of mastering sports skills and improve practical sports capabilities.

### KEYWORDS

Infiltrating track and field training; Tennis training; Training experiment; Special training.



## INTRODUCTION

Physical qualities of human are reflected in speed, strength, endurance, sensitivity and flexibility. Track and field sports events can improve certain qualities intensively. For example, sprinting can improve speed, throwing can improve strength while long distance running can improve endurance. After analyzing demands information mentioned above, we can see that a platform which combines equipments, training and its own management is needed. For equipments management, not only its hardware information, but also repairing and scrapping information are requested; for training management, information and relevant experimental project<sup>[1]</sup> of each lab shall be confirmed, teachers and students will be able to log on and check the plan of their experiment, scores of students can be input and applied; and analysis report of experiment can be uploaded; for platform management, various users shall be authorized with different rights so safety and stability of platform can be assured.

The platform designed in this study could satisfy various demands of different users as mentioned above; at the same time, elements of daily management work were integrated into platform, normalized business process was created and presented in files. In this way, information of each lab could be found fast and conveniently; at the same time, data of all electronic files can be shared. In process mentioned above lab information was managed in files<sup>[2]</sup>. Because this platform was realtime, so that audition and analysis of each process in experiment could be conducted. It was not only good for timely maintenance of lab, but also could provide history documents for managing staff's further checking if there were problems. Many students took track and field training without realizing it; some students even became enthusiasts of track and field sports which would benefit them for a lifetime.

## EXPERIMENTAL STUDY ON INFILTRATING TRACK AND FIELD TRAINING INTO TENNIS TRAINING

Track and field training can improve strength and be applied in tennis training; it consists of many exercises. Swing with assisting power exercise: practice hitting balls with covered rackets on field, move at same time; standing jump, single leg jump, two legs alternately jump, three-grade standing jump, five-grade frog jump, rope skip and continuous skipping ball jump. Computer and internet had been popular since beginning; computer technology is improved constantly; price of computer hardware decreases every day; computer is a common property and a indispensable tool for normal people now. In universities, labs are for experiments, scientific researches and birth land of technology development. Usually, investments for university labs are large, especially for computer labs which develop rapidly these years. In order to satisfy demands of studying and working, various computer labs were built and classified more clearly; as a result, more requests of computer lab management<sup>[3]</sup> appear; not only lab equipments need to be managed, but also computer resources need to be optimized, all kinds of files need to be analyzed and references need to be provided to managing staff for conducting long-term development policy. At present, computer lab managing methods of most universities are backward. Labor management are used mainly and lab managing staffs are bearing heavy work pressures. Therefore, it is necessary to develop a computer lab management platform which can manage lab scientifically, relieve managing staffs from their heavy works and provide data reference for decision makers. Fan running: as shown in Figure 1, at the bottom line on tennis court, start from beginning spot O, shuttle run for 7 times; pick up 5 balls and run: as shown in Figure 2, start from triangle zone, pick up No. 1 ~ No. 5 balls and run to triangle zone, shuttle run with lateral sliding step.

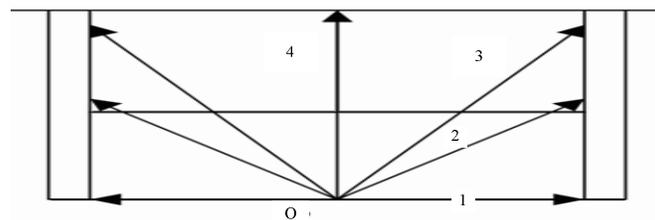


Figure 1 : Diagram of fan running

As shown in Figure 2, start from No. 4 ball, move toward spot A with lateral sliding step, touch side line with hand, move toward spot B with lateral sliding step, touch side line with hand, return back to beginning spot with lateral sliding step.

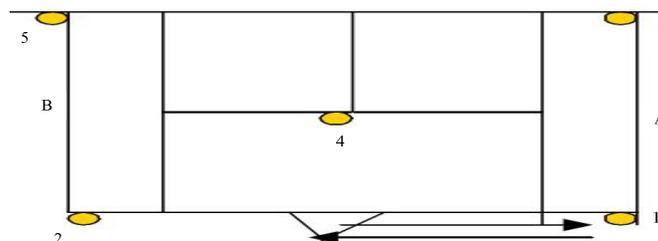


Figure 2 : Diagram of pick up 5 balls and run

Hexagon shuttle skip jump: as shown in Figure 3, start from hexagon, skip jump to the side, do not step on the line, jump back to the center point immediately, jump to the other side, jump three circles in total, do not alter facing direction. It improves ankle joint force and physical balance ability.

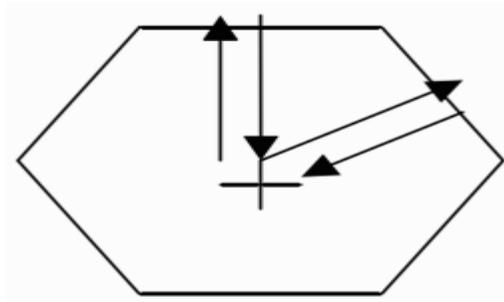


Figure 3 : Diagram of hexagon shuttle skip jump

Walk, run, run on one foot, sudden stop exercises (physical balance practice). Applying track and field training in tennis training in order to improve endurance.

In recent years, some domestic computer labs researched and developed similar systems; like the comprehensive management system designed by Qinghua University, it could realize automatic management in computer room<sup>[4]</sup>; the lab information management system developed by Central South University of Technology, it could use equipments and internet resources reasonably, it was based on the Web and could fulfill automatic management of computer lab. Now in China, there are not only computer lab management systems conducted by universities, but also there are primary and open lab management theories. Moreover, there are commercial software developed for special usages; however, this kinds of software are mostly designed for enterprises, they are not suitable for computer labs but can only provide reference. The scale of sports product industry in our country is not big enough and productive force is not strong enough; in order to improve this status, government service needs to be strengthened, man power and material resource need to be devoted more. Industry standards need to be improved and promoted further, production process needs to be standardized so that level of sports production in China can reach to international advanced level rapidly.

In order to satisfy demands of studying and working, various computer labs were built and classified more clearly; as a result, more requests of computer lab management appear rather than just managing equipments in labs. From TABLE 1 we can see that there was no obvious physical condition difference between Control Group and Experiment Group which belonged to a whole group.

TABLE 1 : Physical condition index of individual sample for t-examination of control group and experiment group before experiment

Index	Group	Average Value	Standard Deviation	T Value	P Corresponding Probability Rate	Obviousness Level
Lung Capacity	Control Group	3470.23	983.40	0.067	0.947	---
	Experiment Group	3487.33	987.99			
Steps	Control Group	176.03	15.42	0.075	0.941	---
	Experiment Group	176.13	15.84			
1500 Kilometers	Control Group	5.39	0.10	0.205	0.839	---
	Experiment Group	5.40	0.15			
Standing Jump	Control Group	3.50	1.04	0.000	1.000	---
	Experiment Group	3.50	1.04			

In universities, labs are for experiments<sup>[5]</sup>, scientific researches and birth land of technology development. Usually, investments for university labs are large, especially for computer labs which develop rapidly these years. In order to satisfy demands of studying and working, various computer labs were built. To see details of inspection result in TABLE 2 and 3.

From examination result in TABLE 2 we can see that, on May the 17<sup>th</sup> 2007, the 20<sup>th</sup> China International Improving Physical Condition Product Exhibition was held successfully. Special institution and committee were set up for conducting relevant industry standards, regulations and management. This meant that our government had started paying attention on industry index plan since then.

**TABLE 2 : Comparison of physical condition indexes of control group before and after experiment (pair sample t-examination)**

Index	Group	Average Value	Standard Deviation	T Value	P Corresponding Probability Rate	Obviousness Level
Lung Capacity	Experiment Group	3487.33	987.99	-2.349	0.026	***
	Control Group	3542.53	927.31			
Steps	Experiment Group	176.33	15.67	0.299	0.767	---
	Control Group	176.13	15.84			
1500 Kilometers	Experiment Group	5.40	0.15	0.754	0.457	---
	Control Group	5.39	0.14			
Standing Jump	Experiment Group	3.50	1.04	0.000	1.000	---
	Control Group	3.50	0.78			

**TABLE 3 : Comparison of physical condition indexes of experiment group before and after experiment (pair sample t-examination)**

Index	Group	Average Value	Standard Deviation	T Value	P Corresponding Probability Rate	Obviousness Level
Lung Capacity	Experiment Group	3470.23	983.40	-9.41	0.000	***
	Control Group	3682.33	907.51			
Steps	Experiment Group	176.03	15.42	14.198	0.000	***
	Control Group	161.87	12.56			
1500 Kilometers	Experiment Group	5.39	0.10	15.449	0.000	***
	Control Group	5.26	0.08			
Standing Jump	Experiment Group	3.50	1.04	-7.167	0.000	***
	Control Group	4.20	0.71			

From experiment result in TABLE 3 we can see that, after one year of studying physical education course, as early as in 2006, China conducted relevant document and put forward industry index plan and protection policy. In June 2006, "Outline of National Intellectual Property Strategy" and patent protection strategy were conducted. It indicated that China government started to pay high attention on industry index programming and situation of domestic relevant products changed at certain degree. Result of skill evaluation of 65 students was shown in TABLE 4.

**TABLE 4 : Statistical table of tennis skill mastering situation of control group and experiment group**

Grading System Percentage	Excellent	Good	Fair	Pass	Fail
Students Number in Experiment Group	6	15	6	3	0
Percentage %	20%	50%	20%	10%	0
Students Number in Control Group	3	9	9	6	3
Percentage %	10%	30%	30%	20%	10%

From this Table we can see that in skill evaluation of Experiment Group conducted by Skill Evaluation Group, 70% students performed at or above Good Level and none of them failed; but for Control Group, only 40% students performed at or above Good Level. Designed platform did not only need to realize management function, but also needed to satisfy following demands in order to assure system operating steadily: firstly, it is supposed to release managing staffs from management model, to improve their work efficiency and to standardize work process, so it must be stable and reliable<sup>[7]</sup>; secondly, it was operated inside universities, so it must be open and prepared for applying management in labs of other departments; thirdly, there were numerous users on it, so humanity designs should be added, platform should be operated easily and conveniently; finally, there was huge number of file information in its data base, and information were connected

through internet, so that safe and confidential measures were extremely important, special agents should be authorized to save, visit or change information. As it was shown in TABLE 5, Experiment Group students got 92 points accumulatively in the competition while Control Group students only got 56 points accumulatively; Experiment Group students got much higher points than Control Group students, it meant that their tennis level and skills were higher than Control Group students.

**TABLE 5 : Statistical points table of experiment group and control group**

<b>Rank</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>
Points	17	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Group	E	E	E	C	C	C	E	E	E	C	E	E	C	C	C	C

Total Experiment Group got 84 points in total. Control Group got 53points in total.

From interview of Experiment Group students and analysis of information requirement we could see that, this platform was a combination of equipment, training and its own management. For equipments management, not only its hardware information, but also repairing and scrapping information are requested; for training management, information and relevant experimental project of each lab shall be confirmed, teachers and students will be able to log on and check the plan of their experiment, scores of students can be input and applied; analysis report of experiment can be uploaded; for platform management, various users shall be authorized with different rights so safety and stability of platform can be assured. The platform designed in this study could satisfy various demands of different users as mentioned above; at the same time, elements of daily management work were integrated into platform, normalized business process was created and presented in files. In this way, information of each lab could be found fast and conveniently; at the same time, data of all electronic files can be shared. In process mentioned above lab information was managed in files. Because this platform was realtime, so that audition and analysis of each process in experiment could be conducted. It was not only good for timely maintenance of lab, but also could provide history documents for managing staff’s further checking if there were problems.

**REVELATION OF INFILTRATING TRACK AND FIELD TRAINING INTO TENNIS TRAINING**

In the study, all elements added in experiments were related to track and field training. Upper limbs' explosive force was developed by throwing tennis ball far away, throwing solid ball, winging covered racket with bared hands and etc.; for training management, information and relevant experimental project of each lab shall be confirmed, teachers and students will be able to log on and check the plan of their experiment, scores of students can be input and applied; analysis report of experiment can be uploaded; for platform management, various users shall be authorized with different rights so safety and stability of platform can be assured. The platform designed in this study could satisfy various demands of different users as mentioned above; at the same time, elements of daily management work were integrated into platform, normalized business process was created and presented in files; it could not only display lab information fast and conveniently, but it also can benefit standard management of lab information. Standing jump, five-grade frog jump can develop lower limbs force; jump over tennis balls continuously (forefoot on land) can develop ankle force; rapidly raise legs, accelerate run can develop speed; slow run, speed sports on field can develop endurance. In experiments, students’ physical conditions were and their mastering skills and techniques were improved.

Moreover, interview and investment of Experiment Group students showed that most of them believed that they got exercises and their physical conditions were improved after taking training; on the other hand, they actually mastered sports skills and enjoyed entertainment. As a matter of fact, most of them got interested in tennis, they participated in tennis plays during their spare time and applied training as what they did in experiment to improve physical conditions, it meant that infiltrating track and field training was useful, that it suited for both original goal of the experiment and physical education guiding theory of universities; good influence on students' physical education thoughts and activities was created. More importantly, foundation of a life time physical exercise was built for students.

Track and field sports are foundation of many other sports, there are basic activities in track and field sports and they are used often in other sports. Taking track and field training often can help people to improve their sports skills and levels. Meantime, this platform is combination of equipments, training and its own management. For equipments management, not only its hardware information, but also repairing and scrapping information are requested; for training management, information and relevant experimental project of each lab shall be confirmed, teachers and students will be able to log on and check the plan of their experiment, scores of students can be input and applied; and analysis report of experiment can be uploaded; for platform management, various users shall be authorized with different rights so safety and stability of platform can be assured.

The platform designed in this study could satisfy various demands of different users as mentioned above; at the same time, elements of daily management work were integrated into platform, normalized business process was created and presented in files. In this way, information of each lab could be found fast and conveniently; at the same time, data of all electronic files can be shared. In process mentioned above lab information was managed in files. Because this platform is realtime, so that audition and analysis of each process in experiment can be conducted. Passive accepting can turn into positive studying.

## CONCLUSION

Track and field training is an important part in conducting “Quality Education” and promoting “Health First” in universities; it plays a significant role in university physical education and shall be promoted and advocated strongly. Students will take infiltrating track and field training in a pleasant atmosphere; it fits demands of National University Physical Education Reform. Students’ interests of track and field can be inspired and new thinking way for bringing track and field training back to university physical health course can be conducted. Since students have great interests in track and field training, it is doable to infiltrate track and field training into Tennis training. Present track and field training is not athletic training with track and field competition as its core element; it is a fundamental exercise which relates to special sports training closely. There are reforms and innovations in infiltrating track and field training which is not simple, boring or uninteresting anymore, it is vivid, interesting and popular training for students now. Many students were fond of track and field training without knowing it; some students even became the enthusiasts of track and field sports which will benefit them for a lifetime. It needs to be further discussed in practice by physical education staffs: how to combine track and field training with other sports so they can complement each other and interact.

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