



Research Article

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Efficiency of The Application of Some Exercises of Tactical Combinations to Improve Student's Calculation Capacity in Chess Classes at HCMC University of Technology and Education

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Abstract

Background: Through the research process, the topic has selected a number of tactical coordination exercises, then applied them to chess classes at Ho Chi Minh City University of Technology and Education (UTE). **Methods:** 66 male students in their 20s are divided into 2 groups of experiments (34 students) and control (32 students) all participating in the chess experiment program. **Results:** After the time of applying tactical coordination exercises, the results of tests performed by the experimental groups and control groups both increased, but the experimental group's growth was more superior than control group's (Means of all 6 tests were significant difference with $P < 0.05$). It shows that the rationality and effectiveness of the tactics coordination exercises selected to be included in the chess curriculum to improve the calculating capacity for students after a period of 4 months of experiment.

Keywords: Calculations, Chess, Coordination, Exercises, Tactics.

1. INTRODUCTION

Chess is an intellectual sport that hides extremely fascinating mysteries, so it attracts up to 600 million people worldwide to play every day [6, 10]. Is a sport was introduced to Vietnam quite late; It was not until October 1984 that the Vietnam Chess Association officially became a member of the Asian Chess Federation. It was only in 1988 that Vietnam was recognized as a member of the World Chess Federation (FIDE) [1].

Although developed after other traditional sports, chess has achieved great success on the world stage. Thanks to the work of teaching, training, and effective training from the base, Vietnamese chess has selected, trained and produced many talented players. Many Vietnamese chess players have been awarded the title of International Grandmaster, International Grandmaster and FIDE Grandmaster [5].

From the experts' point of view, calculating capacity is one of the determinants of sports athletes' results and performances [2, 14, 15]. However, through a preliminary assessment of the current chess teaching at UTE, we realize that the use of methods and means to shape and develop computational competence for students has not really been focused on, so it has a great influence on the learners' interest in learning progress and achievement. Students practical lack the sensitivity and depth to calculate and solve problems, especially when encountering complex situations or being limited in terms of thinking time. Therefore, it is necessary to take appropriate measures to increase the effectiveness of teaching, training, and the inspiration for chess learners, in which attention should be paid to the development of tactical coordination skills

2. MATERIALS AND METHODS

2.1 Participants

66 male students in their 20s and divided into 2 groups of experiment (34 students) and control (32 students). Groups participated in experiments with chess subjects under the Physical Education module

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3 (90 periods) of UTE.

2.2 Procedures

Pedagogical experiment was conducted in 4 months (from September 2018 to January 2019), with a total of 30 sessions in 15 weeks, 2 sessions per week, 150 minutes each session (03 periods). Particularly for the exercises to improve calculating capacity, the experimental group applied the types of exercise that the topic has selected. Both experiment and control groups conducted chess expertise and psychological tests at the times of 4 months before the experiment and 4 months after the experiment (ending the experiment process). All tests have similar goals, requirements, and difficulty, but specific chess positions are different.

In this project, we determined the reliability of 11 tests (7 expertise tests and 4 psychological tests) by using the Retest method (determining the coefficient of confidence between the results of two tests at the same time, same conditions, same subjects). If $r \geq 0.8$, the test is sufficiently reliable. In contrast, tests with $r < 0.8$ removed. The notification of the test results is shown by the correlation coefficient between the test results and the results of the competition in the quick chess tournament (15 minutes / game) in the classroom (the total score achieved in the tournament) in the form of compete in the Swiss system. Requests must have $r_{tc} \geq 0.6$, if $r_{tc} < 0.6$ then discard.

2.3 Statistical analysis

The collected data was analyzed and synthesized through SPSS V22.0 software (SPSS Inc., Chicago, IL, USA). The Wilcoxon signed rank test was used to verify experts's opinion in the selection of tactical coordination exercises and the tests used to test calculating competence for chess students. R (Pearson Correlation) is used to determine the reliability of the chess expertise and the psychological function tests selected to evaluate the calculating competence of

students participating in the experimental process.

Independent t-test is with Levene's equality of variance test was utilized to compare the development of calculating capacity between experiment group and control group. Means and standard deviations were computed for all the parameters. The result will be considered significantly different if $p \leq 0.05$.

3. RESULTS

3.1 Selecting a number of tactical coordination exercises to improve calculating capacity for UTE students

Based on theories and teaching practices, the selected tactical coordination exercise groups should adhere to the following principles: (a) Ensure the development orientation in accordance with the course professional requirements; (b) In accordance with the practical conditions of equipment, machinery for teaching; (c) Suitable for students of UTE's chess classes; (d) Gradually raising the difficulty level to stimulate learners' excitement and thinking and calculation efforts [8].

Through the following 3 steps: (a) Summarize and systematize the exercises to assess chess students's calculating competence [3, 9, 12, 13]; (b) Expurgate less common and less used exercise groups; (c) Interview with experts to identify groups of exercises (according to wilcoxon signed rank test).

Thus, the topic has selected 17 groups of exercises to help improve chess classes student's calculating capacity, including: (1) Double attack; (2) Double check; (3) Discovering attack; (4) Interference; (5) Pinning; (6) Deflection; (7) Attraction; (8) Traps; (9) Clearance; (10) Strangle; (11) Millstone; (12) Assault on overloaded troops; (13) Skewers; (14) Promoting; (15) Looking forward to the draw; (16) Sacrifice; (17) Attacking last row.

Table 1: The results of experts' consultation to select tactical coordination exercises groups to improve calculating capacity for chess classes students (according to Wilcoxon interview twice)

Group of exercises	Lần 1 (n=20)		Lần 2 (n=20)		Test Statistics ^a	
	∑ điểm	%	∑ điểm	%	Z	Asymp. Sig. (2-tailed)
1. Double attack	55	92	55	92	.000 ^b	1.000
2. Double check	53	88	52	87	-.333 ^c	.739
3. Discover attack	56	93	57	95	-.378 ^d	.705
4. Interference	54	90	55	92	-.378 ^d	.705
5. Pinning	56	93	56	93	.000 ^b	1.000
6. Deflection	52	87	55	92	-1.342 ^d	.180
7. Attract	53	88	51	85	-.816 ^c	.414
8. Trap	52	87	52	87	.000 ^b	1.000
9. Clearance	51	85	53	88	-.707 ^d	.480
10. Annihilation of defence	31	52	29	48	.000^b	1.000
11. Strangle	52	87	52	87	.000 ^b	1.000
12. Millstone	49	82	49	82	.000 ^b	1.000
13. Waiting moves	27	45	29	48	.000^b	1.000
14. Assault on overloaded troops	51	85	53	88	-.707 ^d	.480
15. Skewers	52	87	53	88	-.378 ^d	.705
16. Promoting	55	92	55	92	.000 ^b	1.000
17. Demolition of pawn structure	30	50	28	47	.000^b	1.000
18. Looking forward to the draw	52	87	55	92	-1.000 ^d	.317
19. Sacrifice	53	88	54	90	-.447 ^d	.655
20. Attacking last line	54	90	53	88	-.447 ^c	.655

3.2 Application of selected coordinated tactical exercise groups in teaching to assess students's calculating capility in chess classes

Through interviews with experts, the theme has identified the pedagogical experiment process as follows:

- Purpose of the experiment: demonstrate the superiority of the selected tactical coordination exercises to help improve the chess students's calculating capacity.

- Experiment objects: 66 male students in their 20s and divided into 2 groups including experimental group (34 students) and control group (32 students).

- Experiment period: 4 months (from September 2018 to January 2019), with a total of 30 sessions in 15 weeks, 2 sessions per week, each session 150 minutes (03 periods).

- The time for arranging the exercises in the chess lesson plan is the basic part; time for this content is 30 - <70 minutes / lesson plan. The exercises are gradually increasing their difficulty according to the lesson plans and the experimental week.

- Experimental program: Groups learned chess under UTE's Physical Education module 3 (90 periods). Particularly for the exercises to improve the calculating capality, the experimental group applied the exercise groups were selected.

3.3 Evaluating the effectiveness of selected combination coordination exercises

3.3.1 Selecting tests to evaluate chess students's calculating competence at UTE after the experiment process

To determine the tests to evaluate chess students at UTE's calculating competence, the thesis has conducted the following 4 steps:

- Synthesis and systematize the tests to assess the computational competence of chess students used by domestic and foreign authors.

- Leaving out the less common tests.

- Interview by questionnaire to consult experts.

- Check the reliability and notification of selected tests.

Table 2: Reliability and Notification of tests (n = 20)

Tests	R (Pearson Correlation)	
	r	r _{tc}
The Chess Expertise Tests		
1. Analysis, evaluation and planning	0.57	0.21
2. Combination	0.90	0.87
3. Mate in 2-4 moves	0.85	0.86
4. Tactics to attack the King	0.19	0-.12
5. Selecting the optimal plan	0.98	0.85
6. Endgame	0.58	0-.07
7. Strategy	0.95	0.94
Psychological Tests		
Landolt	0.90	0.93
Raven	0.58	0.05
Taping	0.93	0.72
Arithmetic correlation	0.30	0.30

Through Table 2, we have selected 6 tests which ensured reliability and notification. These are 4 expertise tests: Combination (score); Mate in 2-4 moves (points); Selecting the optimal plan (points); Strategy (points) and 2 psychological tests are Landolt Test (bit/s); and Taping Test (score).

3.3.2 Assessing the calculating cability of students in chess classes

Before the application of tactical coordination exercises

Results of pre-experiment test of overall 4 chess expertise tests and 2 psychological function tests were all not significantly different from the average value between experimental group and control group (Sig> 0.05). Thereby, there is no difference in calculating cability when starting to join chess classes among student groups.

After the application of tactical coordination exercises

The research results presented in Table 3 show that, after the experiment period, 4 of 4 chess expertise tests of the experiment group were all superior to the control group, the mean value difference was statistically significant with P <0.05. Meanwhile, after the

experiment period, psychological tests (Landolt and Tapping) of the experiment group also increased higher than the control group's, the mean value difference was statistically significant (P <0.05).

Evaluating the growth of tests after experiments

In chart 1, after experiment, the growth rate of the control group through the individual tests was lowest at 0.47% (Tapping) and the highest was 17.97% (Combination). The average growth rate was 10.55%. Meanwhile, the experiment group has a great increase in the positive direction of calculating capacity after the experiment period. Specifically, the growth rate of individual tests was the lowest at 2.31% (Tapping), while the highest growth rates reached 40.78% (Combination). The average growth reached 25.84%.

Thus, after the time of applying the tactics combination exercises, the results of the tests increased, but the increase of the experiment group was much better than that of the control group (in all 6 of 6 tests). T student values are greater than t in the table with P <0.05). This shows that the correctness, reasonableness and effectiveness of tactical coordination exercises groups when putting them into chess curriculum after 4-month experimental period.

Table 3: Students's calculating competency belong the experient group and the control group after the application of tactics coordination exercises

Criterion	Nhóm	N	Levene's Test for Equality of Variances		Mean	± SD	d	t	Sig. (2- tailed)
			F	Sig.					
Combination	Control	32	2.11	.15	4.73	0.88	1.47	5.97	.00
	Experiment	34			6.20	1.09			
Mate in 2-4 moves	Control	32	1.14	.28	4.73	0.88	1.09	5.43	.00
	Experiment	34			5.82	0.73			
Selecting the optimal plan	Control	32	1.37	.24	5.01	0.81	0.84	4.53	.00
	Experiment	34			5.85	0.68			
Strategy	Control	32	.17	.67	4.57	0.77	1.35	7.00	.00
	Experiment	34			5.92	0.78			
Landolt	Control	32	.56	.45	1.31	0.04	0.11	9.42	.00
	Experiment	34			1.42	0.05			
Taping	Control	32	.53	.46	127.4	2.93	4.2	5.43	.00
	Experiment	34			131.6	3.30			

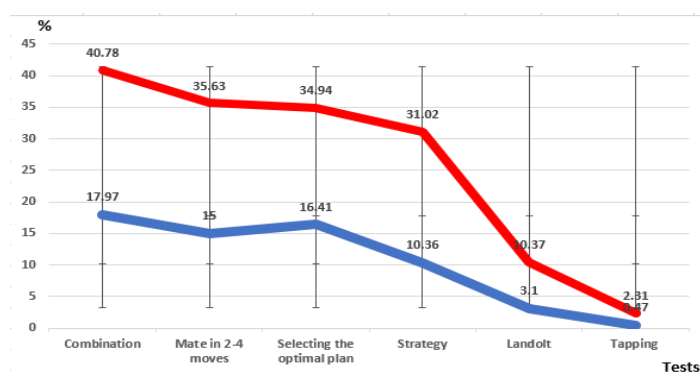


Figure 1: Comparing the growth rate of chess expertise and psychological tests of students belong to experiment group and control control after applying tactics coordination exercises

4. DISCUSSION

After the experiment period, the experimental group had a developed calculating capacity that was superior to the control group and up to 4/4 chess expertise tests showed a difference ($P < 0.05$). It can explain this result is that although all participating in learning with the physical education program, but thanks to the focus on application, experience more tactical coordination exercises groups compared to the control group that students of the experimental group's calculation capacity is more sensitive, accurate and effective than the students of the control group's.

On the other hand, after the experiment both 2/2 psychological tests (Landolt Test and Tapping test) the experimental group developed better than the control group ($P < 0.05$). This fact is because chess is a mental sport, the amount of movement in chess is mainly the amount of psychological movement, directly affecting the trainee's thought process. Throughout the creative and competitive activities, chess players have very little physical activity and spend most of their time behind the chess board. However, if the inability to sustain and withstand high emotional stresses is one of the causes that reduces athletes' ability to compete. This means that it will reduce chess players's athletic state.

5. CONCLUSION

After the application of tactical coordination exercises, the results of the tests of the participating groups increased, but the growth of the experimental group was much better than that of the control group (in

all 6/6 test the t-student value is greater than the t-table value with $P < 0.05$). This shows the correctness, reasonableness and effectiveness of tactical coordination exercises groups when they are included in chess curriculum. This shows that, it is necessary to apply the selected chess test exercise groups to the chess curriculum at UTE to improve students's calculating capacity.

Conflicts of interest

The author confirms that there is no conflict of interest with any financial institution regarding the material discussed in the manuscript.

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Authors' contributions

The author has read and approved the final manuscript. Nguyen Duc Thanh wrote the article, as well as also collected data and contributed to statistical analysis.

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