

Effectiveness of using active learning strategy to achieve certain objectives of the physical education lesson for preparatory-stage students

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Abstract: This research aims to identify the effectiveness of using active learning strategy to achieve certain objectives of the physical education lesson for preparatory-stage students. The researcher used the experimental method and choose the research sample through the intentional, random method from first preparatory students of Port Fouad Preparatory School for the academic year 2009 / 2010. The research sample consisted of 50 students. The researcher achieved the scientific factors for the tests used, in which he used the arithmetic mean, standard deviation, median, skewness coefficient, correlation coefficient, coefficient of analysis of variance (eta squared) and t-test for a single group and for the two groups. The results showed: (1) The use of the technique of demonstration and presentation has a positive impact on the growth of the special physical qualities of basketball, the performance level of the basketball basic skills under research, and increase in the cognitive achievement of basketball. (2) Learning by using active learning strategy is more positive than learning using demonstration and presentation, on the development the special of physical qualities of basketball, basketball basic skills under discussion, and cognitive test of basketball. (3) Learning by using the active learning strategy has changed the roles of both teacher and student, leading to the positive participation of students in the educational process, and reflected on their motivation, leading to increase in their cognitive achievement, further development of the special physical qualities and of the performance level of the basketball-basic skills under discussion.

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1. Introduction

Active learning is a dynamic containing process to the learner in the educational situation, which requires them to move and actively participate under the direction and supervision of the teacher. [1]

Poppenhagen (2005) defines the active learning as a method that allows students to participate actively in the activities in the classroom to take them so far beyond the role of the listener, to the person who takes the lead in activities practiced with their colleagues. [2]

Mathews (2006) adds that active learning encourages the learner to participate and interact with the activities by asking questions and participating in finding out the concepts and exercises based on problem-solving, allowing them to use multiple thinking skills, to improve their creative thinking skills, and to encourage them to make and take decisions. [3]

Supervising a group of fourth-year students of Teaching Department, enrolled in the Field Training in Port Fouad Prep School for Boys, the researcher found a lack of basic skills for many students, the control of know-what over the cognitive content of the curriculum without providing an adequate space for the know-how, accompanied by the development

of higher thinking skills and the development of general skills for multiple use. In addition, there is a weak link of teaching methods currently used to the theories of modern learning theories, especially both cognitive and constructivist theories, requiring the learner to build up their knowledge and to benefit from their previous and new information so as to form a new cognitive structure. Therefore, the researcher wanted to study the effectiveness of using active learning strategy to achieve certain objectives of the physical education lesson for preparatory-stage students.

Research objective:

This research aims to find out the effectiveness of using active learning strategy to achieve certain objectives of the physical education lesson (physical, skillful and cognitive) for preparatory-stage students.

Hypotheses:

1. There would be statistically significant differences between pre and post-tests of the control group in the special physical-qualities and basic-skills tests, and cognitive test of basketball in question in favor of posttests.
2. There would be statistically significant differences between pre and posttests of the experimental group in the special physical-

qualities and basic-skills tests, and cognitive test of basketball in question in favor of post-tests.

3. There would be statistically significant differences between the post-tests of both control and experimental groups in the special physical-qualities and -basic-skills tests, and cognitive test of basketball in question in favor of post-tests for the experimental group.

Research procedures:

The researcher used the experimental method by designing two groups, a control one to use demonstration and presentation, and an experimental one to use the active learning strategy with pre and post-test.

Research sample:

- The research population represents the first preparatory grade students of Port Fouad Prep School, enrolled for the academic year 2009 / 2010. They were selected in an intentional, random method, where their study plan includes basketball.
- The students that were failed, basketball practitioners, repeatedly absent and with sick excuses were excluded. The 50-student research sample was divided into two groups, each of 25 students.

Sample homogeneity:

The researcher conducted the sample homogeneity in the variables of age, height, weight, intelligence, tests special physical qualities for basketball, basketball basic skills tests, and the cognitive testing under discussion by finding out skewness coefficients of tests under discussion.

It was found that all values of skewness coefficients were between ± 3 , which shows the homogeneity of two-group members in the variables of age, height, weight, intelligence, basketball physical fitness components, cognitive testing, and basketball basic skills tests in question.

Sample parity:

The researcher conducted the homogeneity of the research two groups in the variables of age, height, weight, intelligence, tests of special physical qualities, basketball basic skills tests and the cognitive testing under discussion before conducting the basic experiment. The results showed no significant differences between the two groups, indicating their homogeneity.

Tests used:

Tests of basketball physical qualities:

- Speed test: 50-meter running.

- Test of both leg muscle strength: Broad jump from stability.
- Flexibility test: Flexion of the trunk ahead from stand.
- Test of both arm muscle strength: Pushing a medicine ball as far away from stability. [4]

Tests of the basketball basic skills:

- Chest pass test (rapid passing on the wall). [5]
- Dribbling test (the speed of dribbling around a group of obstacles) [5]
- Test of the free throw. [5]
- Test of layup shot. [5]

Cognitive test:

The researcher used the cognitive test, which was prepared by Ahmed Osman Zaki (2009) as it is suitable for the age group of the research sample. It also contains the basic skills and legal aspects as to the research sample method. It also contains drawings of the basketball basic skills. The test includes 35 pictorial questions, of which 30 questions on skills and 5 text questions on information on the legal aspects.[6]

The scientific coefficients of the tests used:

The researcher found out the scientific coefficient of tests in question prior to use by finding coefficient of analysis of variance and correlation coefficient of these tests.

The results showed that the tests under consideration were of high reliability and consistency.

Pre-test:

Pre-test was conducted for the sample students of the tests in question from Sunday, 21/02/2010 to Thursday, 25/02/2010.

Basic experiment:

The usual program was applied to the control group students, and active learning strategy to the experimental group students from Sunday, 28/02/2010 to Tuesday, 20/04/2010 for 8 weeks, 2 lessons a week.

Post-test:

The post-test was conducted to the research sample students from Wednesday, 21/04/2010 to Thursday, 22/04/2010, uniforming with the same terms and conditions which were used in pre-tests.

Statistical treatments:

To check the research aim and test the hypotheses, the researcher used the SPSS software in the statistical treatment of the basic data.

Presentation and discussion of results:

a) Presentation of the first hypothesis results:

Table (1) :Significance of differences between pre and post tests for the control group in the physical and skillful tests and the cognitive test under discussion. ($n = 25$)

| Variables | Pre-test | | Post-test | | Deviation of mean | Mean differences | Calculated t |
|---------------------------------------|----------|---------|-----------|---------|-------------------|------------------|----------------|
| | M | $SD\pm$ | M | $SD\pm$ | | | |
| 50-meter running | 12.13 | 1.07 | 11.71 | 0.49 | 1.092 | 0.65 | 3.01 |
| Broad jump from stability | 155.04 | 3.42 | 158.32 | 2.51 | 3.78 | 3.28 | 4.33 |
| Flexion of the trunk ahead from stand | 3.28 | 1.57 | 3.04 | 1.51 | 1.024 | 1.92 | 7.03 |
| Pushing a medicine ball as far away | 326.4 | 30.22 | 345.6 | 19.38 | 46.84 | 12.52 | 2.25 |
| Chest pass | 1.24 | 0.44 | 3.72 | 0.68 | 0.71 | 2.48 | 17.36 |
| Dribbling | 25.27 | 1.47 | 26.48 | 0.64 | 1.67 | 1.21 | 17.36 |
| Free throw | 0.60 | 0.50 | 2.28 | 0.84 | 0.86 | 1.68 | 9.85 |
| Layup shot | 0.80 | 0.67 | 2.52 | 0.65 | 0.99 | 1.64 | 8.24 |
| Cognitive test | 1.64 | 0.86 | 12.32 | 1.180 | 1.43 | 10.68 | 37.20 |

Value of tabulated t at the level of $0.05 = 2.06$

Discussion of the first hypothesis results:

The researcher attributes these differences between the pre and post tests of the control group in favor of the post test to the educational program content taught using the method of demonstration and presentation, its educational parts for the basketball and each part's content of the warm-up, it contains free warm-up. Through an introductory mini game of basketball, the physical exercises which contain physical exercises of special and general preparation, developing the general physical qualities that are the basis of the basketball fitness components. Then it comes to the main part of the lesson to instruct and apply the the skill to be learned and what it contains of the demonstration of the technical points and the educational steps, explanation of the importance of skill and when to be used, as well as practice of the students through the lessons of the educational program, repeating the performance and giving feedback. That helped them to gain a clear image to

understand how to perform, reflected on the results of the post-test.

These results are consistent with the findings of Harrison (1996) and Karper & Dignan (1997) where those results indicated that the method to demonstrate and present showed a positive impact on the development of the physical side and increase in the the skill level, and cognitive achievement to be used for the presentation of theoretical information, commentary and criticism associated with the model, in addition to learning different skills and cognitive areas, and improving the performance level and time. [7, 8]

Thus, we find that the first hypothesis stating, "there would be statistically significant differences between pre and post tests of the control group in the special physical-qualities and -basic-skills tests, and cognitive test of basketball in question in favor of post tests", has been realized.

a) Presentation of the second hypothesis results:

Table (2): Significance of differences between pre and post tests for the experimental group in the physical and skillful tests and the cognitive test under discussion ($n = 25$)

| Variables | Pre-test | | Post-test | | Deviation of mean | Mean differences | Calculated t |
|---------------------------------------|----------|---------|-----------|---------|-------------------|------------------|----------------|
| | M | $SD\pm$ | M | $SD\pm$ | | | |
| 50-meter running | 11.75 | 0.96 | 10.22 | 0.27 | 1.17 | 1.49 | 6.23 |
| Broad jump from stability | 154.4 | 2.81 | 163.56 | 1.85 | 3.26 | 9.52 | 14.56 |
| Flexion of the trunk ahead from stand | 3.24 | 1.39 | 5.84 | 0.85 | 1.09 | 4.02 | 9.08 |
| Pushing a medicine ball as far away | 327.56 | 25.63 | 423.6 | 24.05 | 24.26 | 68.72 | 14.15 |
| Chest pass | 1.48 | 0.59 | 5.80 | 1.00 | 1.21 | 4.76 | 17.13 |
| Dribbling | 25.23 | 0.85 | 21.49 | 0.36 | 0.9 | 3.74 | 20.59 |
| Free throw | 0.48 | 0.59 | 4.68 | 0.70 | 0.76 | 4.20 | 27.49 |
| Layup shot | 0.92 | 0.76 | 5.88 | 0.78 | 0.93 | 4.96 | 26.35 |
| Cognitive test | 1.60 | 0.76 | 25.60 | 1.12 | 0.29 | 24.00 | 29.95 |

Value of tabulated t at the level of $0.05 = 2.06$

Discussion of the second hypothesis results:

The researcher Attribute these differences between the pre and posttests of the experimental group in favor of the posttest to use the active learning strategy, what this strategy made available, as the involvement of students in selecting the work system and its rules, their involvement in determining their educational goals, and the diversity of learning sources. The most important characteristic of this strategy is making the student the education process core, which is suitable for their abilities, interests, learning styles, and intelligence and reliance on students to evaluate themselves and their colleagues. All this led to the availability of communication in all directions between the students and the teacher, allowing the students to self-management, promoting an atmosphere of tranquility and fun while learning, learning of each student according to their ability,

helping students to understand themselves and discovering the strengths and weaknesses.

From the above, we find that the goal of active learning is to encourage the student towards self-learning and taking responsibility, and to provide an opportunity for innovation, independence, teamwork, active participation in the activities presented to them.

These results are consistent with the findings of Fox (1998); Christianson, Fisher (1999); Indow, L. (2000); Suchman (2001); Wike (2003), and Williams Mriga (2004). [9, 10, 11, 12, 13, 14]

From the above, it is clear that the second hypothesis stating, "there would be statistically significant differences between pre and post tests of the experimental group in the special physical-qualities and -basic-skills tests, and cognitive test of basketball in question in favor of post tests", has been realized.

a) Presentation of the third hypothesis results:

Table (3) Significance of differences in the post-tests for both control and experimental groups in the physical and skillful tests and the cognitive test under discussion ($n_1 = n_2 = 25$)

| Variables | Post-test of the control group | | Post-test of the experimental group | | The difference between the middle | Calculated <i>t</i> |
|---------------------------------------|--------------------------------|-------------|-------------------------------------|-------------|-----------------------------------|---------------------|
| | <i>M</i> | <i>SD</i> ± | <i>M</i> | <i>SD</i> ± | | |
| 50-meter running | 11.71 | 0.49 | 10.22 | 0.27 | 1.49 | 13.26 |
| Broad jump from stability | 158.32 | 2.51 | 163.56 | 1.85 | 5.24 | 8.47 |
| Flexion of the trunk ahead from stand | 3.04 | 1.51 | 5.84 | 0.85 | 2.80 | 8.10 |
| Pushing a medicine ball as far away | 345.6 | 19.38 | 423.6 | 24.05 | 78.00 | 12.63 |
| Chest pass | 3.72 | 0.68 | 5.80 | 1.00 | 2.08 | 8.61 |
| Dribbling | 26.48 | 0.64 | 21.49 | 0.36 | 4.99 | 34.15 |
| Free throw | 2.28 | 0.84 | 4.68 | 0.70 | 2.40 | 11.02 |
| Layup shot | 2.52 | 0.65 | 5.88 | 0.78 | 3.36 | 16.50 |
| Cognitive test | 12.32 | 1.18 | 25.60 | 1.12 | 13.28 | 40.84 |

Value of tabulated *t* at the level of $0.05 = 2.06$

Discussion of the third hypothesis results:

The researcher attributes these results of both post-tests of the control group and the experimental group in the tests under consideration in favor of the post-test of the experimental group to using the active learning strategy, which includes the invitation phase, where the teacher attracts the attention of students through offering some questions or problems that seem confusing or contradictory to the students. This invites them to reflect and think as they raise their surprise. Then, it comes to the second phase, it is the exploration and innovation, where the pupils through collective action challenge their physical, skillful, and mental abilities, search for answers to their questions while they observe and experiment, and then each student presents their findings. Then, it comes to the third phase; it is the proposal of explanations and solutions. It depends on the student's findings with the performance and solutions. The teacher accepts the right, referring to them, and for the incorrect, they guides them to the right path to reach a solution. Then

the phase of taking action comes, at this phase, the student applies their findings of proposals, solutions, results and interpretations.

From the above, we find that the use of active learning has led to an increase in the level of cognitive achievement of students through the students recovering the knowledge, information, and retrieving them when needed. The involvement of students in discussion and debate also led to creating an interactive learning environment that helps them to understand and absorb the concepts related to the subject of the lesson (cognitive, physical, and skillful). Leaving memorization led to an increase in their awareness and understanding, and an increase in the level of achievement. The questions put to students throughout the lesson time also help them to pay attention, focus and feel challenge, which drives them to access to information that are useful for them in answering the questions. This was reflected on the development of basketball physical qualities and the basketball basic skills under consideration as the

increase in knowledge and theoretical information is an activity helping them in the effectiveness of motor learning for this activity. Thus, the physical and skillful performance improves. These results are consistent with the findings of Borno (2002); Boling (2002); David & Wilder (2003); Odubummi (2004); Hall & Liberman (2004), and Mathews (2006). [15, 16, 17, 18, 19, 3]

From the above, it is clear that the third hypothesis stating that "there would be statistically significant differences between the post tests of both control and experimental groups in the special physical-qualities and -basic-skills tests, and cognitive test of basketball in question in favor of post tests for the experimental group" has been realized.

Conclusions:

1. The use of the style of demonstration and presentation has a positive impact on the development of special physical qualities of basketball, the performance level of some basketball basic skills under discussion, as well as an increase in the cognitive achievement of basketball.
2. Learning by using active learning strategy is more positive than learning using demonstration and presentation, in the development of special physical qualities of basketball, basketball basic skills under discussion, and cognitive test of basketball.
3. Learning by using the active learning strategy has led to positive participation of students in the educational process and changing the role of both teacher and students, which was reflected in their cognitive achievement and improvement in both the physical level and the skillful performance level of basic skills under discussion more than the style of demonstration and presentation.

Recommendations:

1. To use the active learning strategy and its applications in educational institutions and various stages of education because for its effectiveness in improving the cognitive achievement and level of physical and skillful performance.
2. To conduct similar studies to demonstrate the effectiveness of active learning on other samples and activities.
3. To do training courses for students, graduates and teachers in the field of physical education to encourage them to use modern strategies during the physical education lesson, including the active learning strategy.

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