

## The Effect of active learning on cognitive and physical abilities of college crawl swimmers

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**Abstract:** Active learning is a dynamic action; occurring during the educational process, the student must active participate under the supervision and direction of the teacher (Sharon, and Martha 2001). The purpose of the study is to investigate the effect of active learning on some physical abilities and cognitive of student crawl swimmers of physical education, El Haram, Helwan Univ. The experimental method was used in this study, 20 students were randomly selected, of the first year, aged 18-19 years, they were divided to two group, one control, the other experimental, (10) student each. The experimental group was subjected to active learning for (8) weeks, 2 lessons per week. The control group were subjected to presentation, demonstration learning lessons. Tests (Physical abilities and cognitive) were performed before and after the programs. The results indicated that the active learning program affected the physical abilities and cognitive one significantly compared to the lessons of demonstration and presentation. It may be concluded that active learning affect positively the physical abilities of the students also the cognitive ones. Active learning is more positive in abilities developments. Also educational process, and change the role of teacher and student reflected on the their performance.

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**Key Words:** Active learning, physical abilities, cognitive, students, crawl swimmers

### Introduction:

Barrett et al (2010) reported that learning is acquisition of the information that makes this possible and memory is the retention and storage of that information. The two are closely related to each other and should be considered together.

Active method of learning has been defined by a number of researchers as a method that allows students to participate actively in the activities in the class room to take them so far beyond the role of the listener, to the person who takes the lead in activities practiced with their colleagues (and this encourages the learner to practice and participate and interact with the activities by asking question and tried to find out the concepts on problem solving, to improve their creative thinking skills and encourage them to take decisions (Wike, 2003, Borno, 2002), Suchman 2001, Odiummi 2004).

The problem of the study is that the researcher found a lack of physical abilities and cognitive structure among the student of the 1<sup>st</sup> year in the faculty of physical education (El Haram), Helwan University. He also observed during the supervision of learning Department the lack of know How among the students and a weak link in teaching methods needed to build up their knowledge and benefit from their information to form a better cognitive structure.

Therefore, the researcher investigated the effect of active learning program one some physical abilities and cognitive of the student crawl swimmers of the 1<sup>st</sup> year of physical education.

As this active learning method can help the student to elevate their physical and cognitive abilities.

The purpose of the study is to investigate the effect of active learning on some Physical abilities and cognitive of physical education students crawl swimmers

### Hypophesis.

1. There are statistical significant difference before and after the program of the control group in some physical abilities and cognitive in favour of post program.
2. There are statistical significant differences before and after the active learning program in some physical abilities and cognitive in favour of post program.
3. There are statistical significant difference after the program in physical and cognitive abilities of the control and experimental groups in favour of the experimental group.

### Methodology:

Procedures of the research: The researcher used the experimental method of control and experimental groups to use demonstration and presentation and active learning.

### Research sample:

The research population represents the first year students in the Fac of physical education of the academic year 2014 – 2015

They were selected intentionally and by random method

The study sample was divided to two equal groups, 10 students each.

### Sample Homogeneity

This was conducted in the variables of age, Height, weight, physical abilities tests, cognitive tests as shown in table (1).

Table (1) indicate homogeneity of the participants as skewness was ( $\pm 3$ )

The Cognitive test of the swimming to the college study was composed of 28 Questions and the answer ( $\sqrt{x}$ )

Examples of the Questions;

- Swimming is classified to 5 essential stages
- Swimming is not known from the ancient era
- Pulling stage lead to up and anterior
- Expiration is done from the nose and mouth
- Technical error is the split of arm movement from the leg movement.
- The first one to use modern technique is the American swimmer Heinz.

During swimming the head is not moving with each stroke of the arm

**Table (1): Sample Homogeneity**

Variables	Control		Experimental		Skewness
	M	SD	M	SD	
Age (y.)	18.1	5.4	17.9	6.4	,58
Weight (K)	71.4	7.6	72.1	5.8	,84
Height (cm)	174.2	8.1	173.9	7.1	,96
Cardio-Resp. endurance	56.9	3.1	55.1	4.1	1.4
Agility	14.9	1.4	15.1	2.6	1.1
Muscle endurance	23.4	5.2	24.2	3.8	1.3
Coordination	9.1	,6	9.4	,9	,81
Cognitive test	5.8	,71	6.1	,84	,92

Table (2) indicated a significant differences before and after the program for the sake of post program of the control group  $P < 0.05$ .

**Table (2): Physical and cognitive tests before and after program of control group.**

Variables	Control				T
	Before		After		
	M	SD	M	SD	
Cardio Resp. Endurance	56.9	3.1	66.4	5.8	3.9
Agility	14.8	1.6	16.1	1.8	2.14
Muscle endurance	23.4	5.2	25.7	3.1	2.5
Coordination	9.1	,6	11.9	2.4	3.1
Cognitive test	5.8	,71	9.5	1.4	6.1

Table (3) indicated a significant differences before and after the program for the sake of post program of the experimental group  $P < 0.05$ .

**Table (3): Physical and cognitive tests before and after program of experimental group**

Variables	Experimental				T
	Before		After		
	M	SD	M	SD	
Cardiovascular	55.1	4.1	69.8	3.4	4.1
Agility	15.1	2.6	19.4	2.9	3.6
Muscle endurance	24.2	3.8	30.1	4.3	4.8
Coordination	9.4	,9	14.2	1.6	5.1
Cognitive test	6.1	,84	15.6	4.3	6.4

Table (4) indicated a significant differences of post programs between the control and experimental groups  $P < 0.05$ .

**Table (4): Differences of post program between the control and experimental groups**

Variables	Control post		Exp. Post		T
	M	SD	M	SD	
Cardiovascular	66.4	5.8	69.8	3.4	2.9
Agility	16.1	1.8	19.4	2.9	3.2
Muscle endurance	25.7	3.1	30.1	4.3	4.9
Coordination	11.9	2.4	14.2	1.6	3.6
Cognitive test	9.5	1.4	15.6	4.3	4.6

**Physical abilities tests:**

1. Cardio Respiratory endurance
2. Agility
3. Muscle endurance
4. Coordination

And cognitive test (Ahmed Abdel Hakim 2014)

Pretests:

Was conducted for the students during 3 days

**Basic experiment:**

The usual program was applied to the control group, and the active learning to the experiment groups this was performed for 8 weeks, 2 lessons a week.

**Post test**

Was conducted to the students for 3 days with the same terms and procedures used in pre-test

**Statistical analysis:**

The researcher used SPSS for the basic data

- Mean
- Standard deviation
- Skewness
- T test
- $P < 0.05$

**Discussion of the 1<sup>st</sup> hypophesis**

There are statistical significant differences before and after the program of the control group in some physical abilities and cognitive in favour of post program.

The improvement in some cognitive and physical abilities in favour of post program may be caused due to the educational program using demonstration and presentation in the educational part of swimming which contain physical exercises and the special and general preparation which in turn led to the development of physical abilities of the students due to its content of the basic components of swimming of technical points and also of educational one, through the lesson performed by the teacher and repeat of the lessons to help the student to learn and remember the past events at the conscious and unconscious level. Learning forms can be through habituation that means through a simple form in which a neural stimulus is repeated many times, the first time it is applied, it is novel and evokes a reaction, however, it evokes less and less electrical response as it is repeated, so the student becomes habituated to the stimulus. Or it may

be through sensitization in a sense the opposite reaction. A repeated stimulus produces a greater response. It is a common knowledge that similar intensification of the arousal value of stimuli (Ganong, 2000), Billinsky and Dragmara, 2006, Grottle 1984).

The present results are in agreement with those of Karper and Dignan (1997) and Viviani and Rizzo, 2002, 2003) Golema et al 1986).

They showed that a positive impact on the development of the physical abilities and cognitive achievement used in case of the presentation and demonstration for learning different skills and cognitive ones. Neuroscientist examine the brain by using new technologies e.g x ray, computed tomography (CT), magnetic resonance imaging (MRI) and positron emission tomography (PET) in adults and children, and are expected to reveal not only the system involved in movement, but also how the brain process movement information, in order to better understand the critical periods of biology (Viviani, 2006). Thus the 1<sup>st</sup> hypothesis of the study has been realized.

**Discussion of the 2<sup>nd</sup> hypophesis**

There are statistical significant differences before and after the active learning program in some physical abilities and cognitive in favour of post program.

The statistical significant differences before and after the active learning program in some physical and cognitive abilities in favour of post program may be attributed to the use of active learning due to involvement of the students in determining their educational goals and the different learning methods used, and make the students more interested in the learning process and the self evaluation of the students which expand their communications to their colleagues and teacher and have more confidence during learning due to the suitability of the environment and help them to discover their potential strength.

The results are in agreement of those of Williams (2004) (Krawczyn et al 1997).

Bahi et al (2004) reported that the learning and memory effects on new synapses in the nervous system also some biochemical changes during learning together with morphological changes during learning such as the changes occurring in calcium concentration in nerve ending which help in the

response to the stimulus and the sensitivity increase the time of the action potential at the end of the nerves which increase calcium in the cells and increase neurotransmitters.

They also added that the hippocampus operate strengthen the memory and concentration increase the memory.

It is clear from the preceeded discussion that the second hypothesis has been realized.

#### **Discussion of the 3<sup>rd</sup> hypophesis:**

There are statistical significant differences after the program in physical and cognitive abilities of the control and experimental groups in favour of the experimental group.

The improvement of the physical and cognitive abilities of the control and experimental groups in favor of the experimental group may be related to the using of the active learning program used by the teacher through asking Questions and any confusing problems, which led the students to think about solving the problems or Questions this may affect their physical and cognitive abilities. So, the searching the any were of the questions stated led to improve their physical and mental abilities by application of their findings and results of thinking.

These results are consistent with those of Boling (2002) and Mathews (2006)

All the improvements related to the study are important to the way of brain building and brain Stimulation, as training is very important for physical fitness, brain stimulation are so important for cognitive ability all these improvement come from active learning from the preceeded discussion, the third hypothesis has been realized.

#### **Conclusion:**

##### **It may be concluded that:**

1- The Use of the classic program of demonstration and presentation affects positively both physical and cognitive abilities of the control groups.

2- The use of the active learning method is more positive than the demonstration and presentation in both physical and cognitive abilities.

3- The active learning method help the students in participation in the educational process, that was reflected in the progress of cognitive and improvement of physical abilities.

#### **Recommendation:**

It is recommended:

(1) To apply the active learning in various years of the physical education fuclties due to its effectiveness for cognitive and physical abilities

(2) To use the active learning methods in different stages of schools

(3) The use of active learning method in other activities

(4) Encourage student to self learning and taking responsibility.

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