

THE EFFECT OF USING COORDINATION ABILITIES PROGRAM ON SOME PHYSICAL & SKILL VARIABLES IN GYMNASTICS FOR PHYSICAL EDUCATION DEPARTMENT STUDENTS AT PALESTINE TECHNICAL UNIVERSITY

Alaa Kamal Eisa - Malek Rasem Abbas

i_k_alaa@yahoo.com

Abstract

The study aims to determine the effect of developing coordination abilities on some physical and skill variables for students of physical education department. To achieve this aim, the study was applied on a purposive sample of physical education students (40 students) enrolled in gymnastics. The researcher used the empirical method. After application of the empirical program on members of the empirical sample and ordinary program on members of the control group, it was found that the proposed training program for coordination abilities applied on the empirical group had a positive and significant effect on developing physical abilities which had a positive and significant effect on enhancing the level of skill performance. Accordingly, the researchers recommend that it is necessary to develop coordination abilities for their importance in enhancing special physical characteristics which are effective in enhancing technical performance.

Keywords: coordination abilities, gymnastics

1. INTRODUCTION

Coordination abilities have special significance as they are related to all physical and motor abilities in addition to close relation with motor performance. They give the individual the power of motor flexibility, the ability to relax, correct feeling of performing directions and distances. All of these are necessary factors for sport performance regardless of the type of sport activity.

Momtaz, 2010 refers that coordination is one of the physical abilities which, once acquired by the athlete, provide him with motor abilities that are the sum of adding and combining various components of fitness. Any athlete cannot perform the required skills unless they own consistence functioning on one hand, between the nervous system and the working muscles on the other.

Writer, 2004 found that in various sport types we can distinguish seven coordinating capacities that, in total, comprise conditions to all types of sport with each ability has its distinct role and significance for each type of sports. From reviewing education literature, these abilities are:

- 1- The ability of position estimation (the ability of time and place orientation): it is the ability of controlling body movement in time and place and realizing body position and changes in terms of the playground, movement, dimensions of playground, lines of playground and the space used by the player in movement.
- 2- The ability of motor connection and coordination. This connection is whether between partial movements forming in total a movement that needs coordination due to its various elements, among partial movements forming in total a motor behavior in which the body is involved or among consecutive processes forming motor combinations.
- 3- The ability to exert suitable effort (the ability of accurate distinction): it is the ability to reach high accuracy and economy in adjusting body movements within stages of complete movement mechanism. It focuses on aware accuracy in distinguishing differences exerted at all movement stages in time and place, between what is actually performed by the player and his perception of movement. This ability is an important condition to master movements. Therefore, it is less dangerous at the learning stage and more significant in skill mastery stage to accurate and detailed limit.
- 4- The ability to keep composure: the athlete's ability to keep body at a certain position and restore this position in case of deviating from it.
- 5- Rhythmic ability (timing & rhythm): it is the ability to realize features of change in movement dynamics and the ability to perform such change during implementation of motor behaviors. It is related to the ability to feel the given rhythm from outside such as the music band, simple sight or hearing support, his consistency during performing movements and the ability to achieve self-rhythm in the player's imagination.
- 6- The ability of quick response: it is the ability to start in a correct movement or a high speed behavior in the shortest time possible in respond to a signal or an alert that may be audio, visual or other alerts. Response often comes with maximum speed.
- 7- The ability of adaptation: it is the ability to change the sequence of motor behavior or adjusting it during implementation to suit changes in situations, circumstances that can be directly felt, expected in moments previously or the ability to follow-up the application of movements sequence of motor behavior but in another way.

Since gymnastics requires a high level of coordination abilities to perform motor skills with high flexibility, as all body movements are performed based on all parts of the body, the player has to possess the coordination ability. Through the work of the current study's researchers as demonstrators of gymnastics course, they noticed that there is a weakness in the level of performing motor skills as a result of weak training of students in coordination abilities. Therefore, the researchers selected this study to determine the significance of training using coordination abilities on developing skill and physical levels of students.

The significance of this study lies in that coordination abilities training may play an important role in developing a player's skill level considering that a student who lacks a certain aspect of these coordination abilities may find a real difficulty in reaching performance mechanism as well as lacking the ability to balance movements and their outcomes including skills with high levels of performance difficulty. In addition, the training program may play an important role in developing the level of skill and physical abilities of students, increasing the interest in coordination abilities being among factors which help to achieve and reach higher levels with other factors.

Definitions of Terms:

Coordination Abilities: They are general motor and psychological conditions that enable the athlete to control motor performance. They include: (the ability to estimate position, the ability of motor connection, the ability to exert suitable effort, the ability of balance, the ability to use consistent motor rhythm, the ability of quick response and the ability to adapt to changing circumstances).

Objectives of the Study:

The study seeks to achieve the following goals:

- 1- To determine the effect of the proposed training program of coordination abilities on some skill and physical variables of members of the empirical group.
- 2- To determine the effect of the traditional program on some skill and physical variables of members of the control group.
- 3- To determine differences between members of both empirical and control groups in some skill and physical variables on post-test.

2. HYPOTHESES OF THE STUDY:

- 1- There are statistically significant differences between pre- and post measures for both the control and empirical group in measurements of the selected physical tests.
- 2- There are statistically significant differences between pre- and post measures for both the control and empirical group at the technical performance level of motor skills.
- 3- There are statistically significant differences in the post measures for both the control and empirical group for the sake of the empirical group.

Procedures of the Study

3. METHODOLOGY:

The researchers used the empirical method.

Population of the Study:

The population of the study included students of Physical Education Department at Palestine Technical University / Khadouri.

Sample of the Study:

The sample of the study was selected from students of Physical Education Department at Palestine Technical University in purposive manner for the following reasons:

1. Easy to find members of the sample at times dedicated for training.
2. Close age levels among students of the sample.

The sample consisted of (40) students. The researchers eliminated sick, injured, failed students in the course, students who exceeded the allowed percentage of absence (2 students) and students who participated in scientific trials of tests (16 students). In the light of remaining number, the researcher divided the sample randomly into:

- 1- A sample of (10) was students selected as control group subject to traditional program of training on motor skills on the parallel device.
- 2- A sample of (10) was students selected as empirical group subject to traditional program of training on motor skills on the parallel device.

Physical Characteristics Test:

The researchers surveyed the views of (6) experts in this field. Annex (1) contains names of experts.

- Test of pulling on the horizontal bar.
- Test of trunks bending from lying.
- Test of raising trunks from prostration.
- Vertical jumping test.
- Test of trunks bending forward from sitting.

4. DISCUSSION OF RESULTS:

First: results of first and second hypotheses say that there are statistically significant differences between pre- and post measures for both the control and empirical group in the selected physical abilities and technical performance level tests on devices under study.

Table (4) Differences between pre and post-tests for the empirical group in physical abilities and technical performance level tests

Statistics Tests	Pre-test		Post-test		T Value	Improvement Percentage
	Mean	S.D±	Mean	S.D±		
Physical Abilities Tests						
Pull on horizontal bar	5.200	1.135	8.700	1.330	21.122	61.538
Raising trunks from prostration	8.800	0.632	14.200	1.229	17.676	61.363
Bending trunks from lying	9.800	0.632	14.400	0.843	13.532	46.938
Vertical jumping test	52.100	1.663	60.000	1.154	19.416	15.163
Bending trunks forward with long sitting	19.400	1.505	24.100	1.197	14.030	24.226
Skill Performance Tests						
Ground movements device	1.750	0.424	7.400	0.394	23.911	322.857
Jumping table device	1.850	0.337	6.900	0.316	32.118	272.972
The parallels device	1.850	0.241	7.000	0.333	48.258	278.387
The ring	1.650	0.241	7.400	0.316	37.421	348.484

Table (4) shows differences between pre- and post-tests in physical abilities test of the empirical group subject to the proposed training program achieved essential advance at level 0.05 in all physical abilities tests applied during the period of the study. The improvement percentage was (15.163, 61.538%). The researchers attribute this advance to the nature and contents of the proposed training program in addition to the training method used in this group. The researchers also attribute the advance in physical abilities level to the used coordination training as it helped raise efficiency of the nervous system and developed connection between sensory and motor nerves. In addition, table (4), which is about pre and post-tests in evaluating skill performance of the devices under study for the empirical group showed that there was an essential progress at level 0.05 in evaluation degrees of skill performance level during trial period. Improvement percentage of skill performance was (272.972, 384.484%). The researchers attribute this improvement to the use of coordination training to enable students to direct their movements efficiently which was reflected on improving the performance of skills on gymnastics devices under study.

This agrees with Ibrahim (2014), Al Khadour (2011) and Abo Beshara (2010) as they found that there was a significant positive effect for the proposed training program on physical and skill variables for members of the empirical group. Both researchers agree with Adbelmonem (2007) who said that coordination is one of the motor physical abilities which were important in the individual's life in general and in practicing sport activities, especially those in which motor performance requires the use of more than one organ of the body in more than one direction at the same time. Coordination depends on correct connection and integration between muscular and nervous systems to achieve optimal performance of movements, especially complex ones.

The researchers also found that the proposed coordination training developed technical aspects which is due to alerting sensory receptors in muscles and, in turn, improve motor sensing. In addition, similar skill training with technical performance works to

achieve balance between (excision and inhibition) related to nervous activity which leads to make players quickly enter a stage of mastery of the skill.

Table (5) Differences between pre and post-tests for the empirical group in physical abilities and technical performance level tests

Statistics Tests	Pre-test		Post-test		T Value	Improvement Percentage
	Mean	S.D±	Mean	S.D±		
Physical Abilities Tests						
Pull on horizontal bar	4.900	0.737	6.300	1.059	6.332	28.571
Raising trunks from prostration	8.700	0.674	9.900	0.737	6.000	13.793
Bending trunks from lying	9.600	0.516	10.300	0.483	4.280	7.291
Vertical jumping test	52.200	1.475	55.900	1.197	14.212	7.088
Bending trunks forward with long sitting	19.700	2.002	21.100	2.024	8.573	7.106
Skill Performance Tests						
Ground movements device	1.650	0.579	5.00	0.707	31.391	203.030
Jumping table device	1.800	0.349	4.750	0.634	18.762	163.888
The parallels device	1.800	0.258	4.850	0.474	26.143	169.444
The ring	1.700	0.259	5.000	0.471	29.850	194.117

Table (5) shows differences between pre- and post-tests in physical abilities test of the control group subject to the proposed training program achieved advance at level 0.05 in all physical abilities tests applied during the period of the study. The improvement percentage was (28571, 7.08%). The researchers attribute this advance to the nature and contents of the proposed training program in addition to the training method used in this group in addition to regular training. The researchers also found that gymnastics training and movements tackle various moves for body organs at the same time which leads to develop the student's physical abilities. In addition, table (5), which is about pre and post-tests in evaluating skill performance of the devices under study for the control group subject to the traditional program (studying program) showed that there were essential differences at level 0.05 of skill performance level during trial period. Improvement percentage of skill performance was (203.030, 163.888%). The researchers attribute this improvement to the nature and contents of the studying program to which the control group was subject.

Second: the third hypothesis (There are statistically significant differences in the post measures for both the control and empirical group for the sake of the empirical group) results

Table (6) Differences between empirical and control group in physical abilities and skill performance tests

Statistics Tests	Empirical Group		Control Group		T Value
	Mean	S.D±	Mean	S.D±	
Physical Abilities Tests					
Pull on horizontal bar	8.700	1.330	6.300	1.059	4.448
Raising trunks from prostration	14.200	1.229	9.900	0.737	9.484
Bending trunks from lying	14.400	0.843	10.300	0.483	13.314
Vertical jumping test	60.000	1.154	55.900	1.197	7.759
Bending trunks forward with long sitting	24.100	1.197	21.100	2.024	4.033

Skill Performance Tests					
Ground movements device	7.400	0.394	5.00	0.707	9.374
Jumping table device	6.900	0.316	4.750	0.634	9.588
The parallels device	7.000	0.333	4.850	0.474	11.727
The ring	7.400	0.316	5.000	0.471	13.370

Table (6) is about differences between empirical and control group in post-test in physical abilities and skill performance tests for the devices under study as it showed that there was an essential advance for the empirical group at level 0.05 at all physical abilities and skill performance tests. The researchers found that this was because the empirical group implemented the proposed training program and planned based on scientific bases following modern scientific principles of sport training in improving physical abilities and motor skills. In addition, the proposed coordination training considered all types of physical abilities related to devices under study which played an important and essential role in improving skill performance level of the skill under study.

This agrees with Minloziorcoa et al (2005), Ibrahim (2014), Al Khadour (2011) and Abo Beshara (2010) who found that coordination abilities play a positive role in improving physical abilities which have a positive effect on skill performance level.

The researchers found that the proposed coordination training led to improve physical abilities related to the skill under study. This led to increase the ability to control systems of the body and economize effort with coordination among movements of the body. This, in turn, also led to develop motor paths of skill performance and decrease learning period in order to reach good performance level at the least possible time period. It was also found that defining physical abilities related to the skill, setting proposed physical training with various use of muscular work methods led to positive results at the physical abilities level.

5. CONCLUSIONS:

Based on findings related to objectives of the study, in the light of the used methodology and at limits of the sample and its characteristics, the researcher concluded the following:

- 1- The proposed training program using coordination training directed to improve physical abilities related to skills on gymnastics devices under study on the empirical group had a positive effect in developing physical abilities related to skill performance level.
- 2- The proposed training program using coordination training was effective in improving skill performance level on devices under study.
- 3- The training program related to Department of Physical Education at Palestine Technical University on the control group led to relative improvement in physical abilities related to skill performance level on gymnastics devices under study.

6. RECOMMENDATIONS:

At the limits and procedures of the study, the researcher recommends the following:

- 1- It is necessary to benefit from the proposed training program by workers in teaching and training gymnastics to improve physical abilities using coordination training for their importance in improving technical performance of skills on gymnastics devices.
- 2- It is necessary to conduct similar studies to determine the effect of coordination training of gymnastics skills on the other devices for the purpose of raising the level of performance in gymnastics.

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