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The effect of using complex exercises in a competitive manner in improving some mental processes and ball skills in rhythmic gymnastics among second-stage female student

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Abstract

The purpose of this paper is to preparing complex exercises in a competitive manner to improve some mental processes and ball skills in rhythmic gymnastics among second-stage female students, and identifying the effect of knee exercises in a competitive manner in improving some mental processes and ball skills in rhythmic gymnastics among second-year female students. The researcher used the experimental method because it suits the nature of the research and because the experimental method is characterized by the accuracy of its results compared to other results. The researcher followed the design of the experimental and control group with two pre- and post-tests, that is, measuring two groups before and after the experiment. The difference between the two results for measuring the variable is considered evidence of the effect of the experimental factor. One of the most important results reached by the researcher is that: Complex exercises have a positive effect in improving some mental processes (Attention acuity, concentration of attention), compound exercises have a positive effect in developing some basic skills, and using complex exercises within the educational curriculum in the special preparation stage has an effective positive effect in improving the mental processes and basic skills of the research sample. One of the most important recommendations recommended by the researchers is that: Adopting complex exercises within the educational curricula designated for female learners within the rhythmic gymnastics curriculum, and paying attention to complex exercises because they help improve some of the students' mental processes.

Keywords: Compound exercises, competitive manner, mental processes (Attention), ball skills, rhythmic gymnastics

Introduction

The progress that occurred in the areas of life in general and in the field of mathematical learning was not the result of coincidence, but rather was the result of efforts undertaken by scientists and specialists in the academic and applied fields, using a scientific methodology aimed at improving the abilities and skills of learners at all levels. Rhythmic gymnastics has had a large share of the development witnessed in individual and team sports, as it is one of the games that is played by women only and has its own audience that is interested in it. Female coaches are racing against time in order to improve all aspects of the numbers of this game, and the best evidence of this is it what we see in the Olympic tournaments and the high preparation. Therefore, the female trainers were searching for everything that would develop and improve this game, especially the skill aspect, and they found that the complex exercises performed by the student played a major role in the performance and numbers aspects, including the skill aspect, which was mentioned by (Arnold, 1981) ^[1]. "That is, what is required of the learner is to apply various forms of implementing the skill in different situations and to practice performing the skill in a situation that is as similar or close to real playing situations as possible (Arnold, 1981, p. 78) ^[1]. Performing complex exercises imposes on the learner a number of mental processes, including attention, which helps in controlling the tool in order to solve the kinetic tasks that the learner is required to perform, considering that complex exercises raise the level of the learners' performance as a result of the impact of these exercises on the skill aspect as well as on the mental processes and attention.

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It plays a major role in the learner's kinetic behavior, emotions and responses, and is also considered one of the most important factors influencing the process of learning kinetic skills for female learners. The importance of the research lies in the fact that the complex exercises given to female learners during educational units, especially female students from the early stages of learning, lead to improving mental processes, including attention, among female learners, which in turn leads to improved skill performance while performing skillful movements on the ball.

Research problem

Mental processes, especially attention, have an important role in teaching special skills in rhythmic gymnastics with the ball tool, especially since it is distinguished by its special nature due to its lightness and small size and how to control it while performing throws. The researcher, through her experience as a teacher and through her follow-up of the level of female students, found that most teachers do not focus on improving mental skills, especially attention, in the vocabulary of educational units, as well as the lack of interest of some studies in applying scientific methods that include improving basic mental processes within their educational curricula through the use of exercises. The compound, which prompted the researcher to use these exercises and learn about their effect in improving some mental processes, including attention and some ball skills in rhythmic gymnastics among second-year female students.

Research objectives

- Preparing complex exercises in a competitive manner to improve some mental processes and ball skills in rhythmic gymnastics among second-stage female students.
- Identifying the effect of knee exercises in a competitive manner in improving some mental processes and ball skills in rhythmic gymnastics among second-year female students.

Research hypotheses

- There is an effect of complex exercises in the competitive style in improving some mental processes and ball skills in rhythmic gymnastics among female students of the second stage.
- There is an effect of compound exercises in improving some ball skills in rhythmic gymnastics among second-year female students.

Research fields

- **Human field:** Female students of the second stage - College of Physical Education and Sports Sciences/University of Wasit.
- **Time field:** (8/2/2023) to (1/6/2023)
- **Spatial field:** Hall of the College of Physical Education and Sports Sciences/University of Wasit.

Definition of terms

First: Complex exercises: "They are exercises that consist (combined) of several activities and basic principles that are built on basic exercises that the student has previously mastered and that are similar to real performance" (Zuhair Qasim Al-Khashab (*et al.*); 1999, p. 191) [6].

Second: Mental processes: "These are the events that take place inside the brain from the moment the stimulus arrives to the moment the decision is made to respond to that stimulus" (Yarub Khayoun: 2002, p. 47) [7].

Research methodology and field procedures

Research Methodology

The researcher used the experimental method because it suits the nature of the research and because the experimental method is characterized by the accuracy of its results compared to other results. The researcher followed the design of the experimental and control group with two pre- and post-tests, that is, measuring two groups before and after the experiment. The difference between the two results for measuring the variable is considered evidence of the effect of the experimental factor.

Table 1: shows the experimental design of the research

Division	Number of female students	Number of exclusions	Number of individuals in the exploratory experiment	Number of experimental group	Number of control group	Pre-test	Experimental independent variable	post-test
Division A	30 students	2	8	10	10	-	Competitive exercises in a competitive manner	-

Community and sample research

The research sample population included (150) male and female students, and the research sample was deliberately selected for only female students because the subject of rhythmic gymnastics is taught to female students, and their number was (30) female students from the College of

Physical Education and Sports Sciences for the academic year 2022/2023, and they are represented in Division (A), as after Excluding (2) female students due to injury and (8) female students for the exploratory experiment. The number of the experimental group became (10) female students and the control group (10) female students.

Table 2: represents the equality of the research variables

variables	experimental group		control group		T value calculated	Level Sig	Type Sig
	Mean	Standard deviation	Mean	Standard deviation			
Attention	7.300	0.823	6.100	0.875	1.872	0.061	non-sig
Sharpness of attention	71.400	5.747	68.400	7.949	0.618	0.722	non-sig
Throwing and receiving the ball	2.90	0.77	2.80	0.67	0.466	0.361	non-sig
Rotation of the body with the ball	2.40	0.52	2.20	0.67	0.331	0.355	non-sig
Dribbling the ball with a scissor action	2.00	0.67	1.70	0.67	0.762	0.949	non-sig
Roll the ball on the arms in an extended position	2.80	0.48	2.60	0.46	0.667	0.744	non-sig
Throwing the ball while performing a scissor jump	2.00	0.67	2.10	0.57	0.118	0.308	non-sig

Devices and tools used in the research

(Computer (P4) + CD-ROMs, projector (Data Show), video camera type (Sony), audio recording device that points to the right and the other to the left, manual calculator (type (Sharp, gymnastics ball (20), electronic stopwatch (2). Type (T.F), made (Chinese), chairs (18), gymnastics court).

Methods of collecting information

(Arabic and foreign sources and references, personal interviews, tests and standards, observation and experimentation).

Determine search variables**Determine the variables**

1. The future variable is compound exercises in a competitive manner.
2. The dependent variable is attention.
3. Some ball skills in rhythmic gymnastics.

Determining the skills for the research:

Ball skills in rhythmic gymnastics were determined based on the college's special curriculum for the second stage of the academic year 2022/2023 for the first semester, and the following skills were (throwing and receiving the ball, rotating the body with the ball, and tumbling the ball with scissors). Rolling the ball on the arms in an extended position, throwing the ball while performing a scissor jump.

Nomination of the attention test

The attention test was chosen after creating a form containing several tests, and this test was chosen after presenting it to the experts.

Borden-Infimov test: To measure aspects of attention, see Appendix (1), (acuity of attention, focus of attention).

Exploratory experiments

First exploratory experiment: "It is a small experiment or mini-work for general study carried out by the researcher in order to identify the negatives and positives that accompany conducting the main research experiment. The researcher conducted the first exploratory experiment on 5/2/2023, which coincides with Sunday At nine in the morning, in order to determine the suitability of the complex exercises with the research sample, the experiment was conducted with the entire sample being (8) female students.

Second exploratory experiment: The second exploratory experiment was conducted on 6/2/2023, corresponding to Monday at nine in the morning, on a sample of (8) female students other than the research sample, with the presence of a work team consisting of (Nour Al-Huda Kazem, Farah Essam, Alia Khudair), in order to identify the validity and suitability of the tests. The purpose of the first and second exploratory experiments was as follows:

1. Knowing the difficulties and problems facing the researcher when implementing the experiment.

2. Adapting complex exercises to the research sample.
3. Adapt the exercises to the time of the specific educational units.

Search procedures

Pre-tests: The pretests for the research sample were conducted on Thursday, February 7, 2023, corresponding to Tuesday, at nine o'clock in the morning in the hall of the College of Physical Education and Sports Sciences, Wasit University, for rhythmic gymnastics. Due to the special conditions of the tests, the method of conducting them, and the work team, the researcher sought to achieve the same conditions as much as possible when conducting the post-tests.

- The tests of attention and basic skills were explained in detail by the researcher before conducting the test.
- The test was applied by the researcher so that the sample members could understand the test and the validity of its application.
- The results were recorded according to the specifications specified for the test.

Main experiment

After completing the preparation of the complex exercises, they were presented to a group of experts and specialists to express their opinions and suggestions and their suitability to the research sample. The researcher relied on the observations and directions received from them. The vocabulary for complex exercises was developed in light of this. The main experiment was conducted on the research sample for a period of (16) weeks, starting from 8/2/2023, corresponding to Wednesday, until 1/6/2023, corresponding to Thursday, at the rate of one educational unit per week. The number of educational units reached (16) units, and the time of each educational unit took (50 minutes) The work is limited to the educational and applied parts only of the main section of the training unit, for a period of (50 minutes). (3 minutes) were allocated for the educational part and (42 minutes) for the applied part, and this should be done in all other sections of the educational unit.

Post-tests: The post-tests for the research sample were conducted on 4/6/2023, Sunday, at nine in the morning. The researcher followed the same conditions and procedures as the pre-tests.

Statistical methods: The search data was processed through the Statistical Package for the Social Sciences (SPSS).

Results and Discussion

Presentation and analysis of the results of the pre- and post-attention tests for the research sample and the control group

Table 3: shows the arithmetic means and standard deviations for the pre- and post-tests on the variables under study for the control group

variables	Pre-test		Post-test	
	arithmetic means	standard deviations	arithmetic means	standard deviations
Attention	6.100	0.875	7.400	1.074
Sharpness of attention	68.400	7.949	86.500	9.245
Throwing and receiving the ball	2.80	0.67	5.20	0.79
Rotation of the body with the ball	2.20	0.67	5.50	0.53
Dribbling the ball with a scissor action	1.70	0.67	5.50	0.71
Roll the ball on the arms in an extended position	2.60	0.46	5.50	0.53
Throwing the ball while performing a scissor jump	2.10	0.57	5.50	0.71

Significant when the SIG value is smaller than 0.05 at 9 degrees of freedom and a significance level of 0.05.

Table 4: shows the difference of the arithmetic means, the standard error of the difference of the arithmetic means, the T value, the level of error, and the significance between the values of the pre- and post-tests in the variables under study for the control group

Variables	arithmetic mean of difference	Standard error	T value calculated	Level Sig	Type Sig
Attention	1.300	0.539	2.41	0.039	Sig
Sharpness of attention	8.1001	6.585	2.714	0.041	Sig
Throwing and receiving the ball	2.40	0.23	10.29	0.000	Sig
Rotation of the body with the ball	3.30	0.20	16.50	0.000	Sig
Dribbling the ball with a scissor action	3.80	0.20	19.00	0.000	Sig
Roll the ball on the arms in an extended position	2.90	0.19	14.92	0.000	Sig
Throwing the ball while performing a scissor jump	3.40	0.16	20.82	0.000	Sig

Significant when the SIG value is smaller than 0.05 at 9 degrees of freedom and a significance level of 0.05.

Table 5: shows the arithmetic means and standard deviations for the pre- and post-tests on the variables under study for the experimental group

variables	Pre-test		Post-test	
	arithmetic means	standard deviations	arithmetic means	standard deviations
Attention	7.300	0.823	12.70	1.059
Sharpness of attention	71.400	5.747	106.400	9.731
Throwing and receiving the ball	2.90	0.77	7.00	0.82
Rotation of the body with the ball	2.40	0.52	7.00	0.67
Dribbling the ball with a scissor action	2.00	0.67	6.90	0.74
Roll the ball on the arms in an extended position	2.80	0.48	7.20	0.79
Throwing the ball while performing a scissor jump	2.00	0.67	6.90	0.74

Table 7: shows the difference of the arithmetic means and its standard deviation of the difference of the arithmetic means, the value of T, the level of error, and the significance between the values of the pre- and post-tests in the variables under study for the experimental group

Variables	arithmetic mean of difference	Standard error	T value calculated	Level Sig	Type Sig
Attention	5.400	0.3055	17.68	0.000	Sig
Sharpness of attention	35	4.36	7.319	0.000	Sig
Throwing and receiving the ball	-4.10	0.32	12.69	0.000	Sig
Rotation of the body with the ball	4.60	0.27	17.25	0.000	Sig
Dribbling the ball with a scissor action	4.90	0.23	21.00	0.000	Sig
Roll the ball on the arms in an extended position	4.40	0.35	12.64	0.000	Sig
Throwing the ball while performing a scissor jump	4.90	0.18	27.30	0.000	Sig

Significant when the SIG value is smaller than 0.05 at 9 degrees of freedom and a significance level of 0.05.

Table 8: shows the arithmetic means, standard deviations, T value, error level, and significance of the post-test values between the experimental and control groups

variables	Experimental group		Control group		T value calculated	Level Sig	Type Sig
	Mean	Standard deviation	Mean	Standard deviation			
Attention	12.70	1.059	7.400	1.074	11.105	0.000	Sig
Sharpness of attention	106.4	9.731	86.500	9.245	6.618	0.000	Sig
Throwing and receiving the ball	7.00	0.82	5.20	0.79	5.014	0.00	Sig
Rotation of the body with the ball	7.00	0.67	5.50	0.53	5.582	0.000	Sig
Dribbling the ball with a scissor action	6.90	0.74	5.50	0.71	4.332	0.001	Sig
Roll the ball on the arms in an extended position	7.20	0.79	5.50	0.53	5.667	0.000	Sig
Throwing the ball while performing a scissor jump	6.90	0.74	5.50	0.71	4.332	0.000	Sig

Significant when the SIG value is smaller than 0.05 at 18 degrees of freedom and a significance level of 0.05.

Discussion of the results

When observing the results for the experimental and control group, there were differences in the control group between the pre-test and the post-test, in favor of the post-test, and this is due to the school method that was followed in the classroom. Likewise, there were differences for the experimental group between the pre-test and the post-test, and the improvement was very clear due to the methods that the researcher followed in the complex exercises that she prepared for this purpose. These results show that there are statistically significant differences between the two post-tests for the control group and the post-test for the research sample in the experimental group in the attention test and in favor of the post-test for the experimental group.

This shows the extent of the impact of the complex exercises introduced into the educational curriculum on improving

some mental processes, including attention acuity, as it is considered one of the most important mental processes that the learner needs to great degrees while learning basic skills, especially during educational units, and this process requires the highest degree or level of acuity. Paying attention to the purpose of the learner's understanding of all parts of the skill to be learned" (Amir Hanna Markos: 1994, p. 27) ^[5], which leads to giving an integrated picture of the nature of the kinetic performance of the skill to be implemented or the plan to be trained on. In the first learning processes for a kinetic skill, the learner needs full attention to the course of the kinetic performance in its complete and partial form by receiving the main stimuli involved in the work, which come through the senses of hearing and sight, which leads to the formation of the mechanism of kinetic work by choosing the main stimulus appropriate for the kinetic work and thus

forming or choosing The appropriate kinetic response to the chosen stimulus (Abu Talib Muhammad Saeed; 1990) [2].

The results also showed that there was an improvement in concentration and concentration of attention, as the complex exercises gave the research sample a new opportunity to control and control thoughts, which increased their ability to concentrate by isolating the distracting factors and trying to focus on the aspects related to performance, which played an important role in improving the ability. They have focus, "The athlete who has deep focus is the one who can reconcile the physical and mental harmony of his own being" (Osama Kamel Rateb: 1995, p. 342) [4]. The learner needs to control the student's attention in order to control her performance

Conclusions and Recommendations

Conclusions

According to the results reached by the researcher, she came to the following conclusions:

- Complex exercises have a positive effect in improving some mental processes (attention acuity, concentration of attention).
- Compound exercises have a positive effect in developing some basic skills.
- Using complex exercises within the educational curriculum in the special preparation stage has an effective positive effect in improving the mental processes and basic skills of the research sample.

Recommendations

According to the findings, the researcher recommends the following:

- Adopting complex exercises within the educational curricula designated for female learners within the rhythmic gymnastics curriculum.
- Paying attention to complex exercises because they help improve some of the students' mental processes.
- Paying attention to complex exercises because they help improve some basic skills for female students.

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Appendix (1)

Explains complex exercises in a competitive manner for some

ball skills in rhythmic gymnastics

First exercise

The students are divided into two groups. Each group includes five students. Group (A) is matched by Group (B) in the form of a locomotive. Each student holds the ball and stands at the starting line. When the whistle is heard, the first two students from the locomotive start by throwing the hoop to the top and making a rotation, then holding it until the end of the line. In a competitive manner, the last student is awarded the prize, and then it is handed over to her colleague from the corresponding group (A).

Second exercise

The students are divided into two groups, each group consisting of five students. Group (A) is faced by Group (B) in the form of a locomotive. Each student holds the ball in front of her body and stands at the starting line. When the whistle is heard, she moves forward with the hoop rotating to the sides. She throws it up and catches it until the end of the line and hands it to her colleague. The same group, at a specific time, and in a competitive manner, to the last student, and then she is handed over to her colleague from the corresponding group (A).

Third exercise

The students are divided into two groups. Each group includes five students. Group (A) is matched by Group (B) in the form of a locomotive. Each student holds the ball and stands at the starting line. When the whistle is heard, the student starts and performs a turn with the hoop in the form of & without half a turn, and throws the ball and holds it until the end of the line and then it is handed over to her colleague from the corresponding group (A).

Fourth exercise

The female students are divided into two groups, each group consisting of five female students. Group (A) is matched by Group (B) in the form of a locomotive. Each female student holds the ball and stands at the starting line. When the whistle is heard, the female student starts and performs a rotation with the ball in the form of & and a half rotation without throwing or receiving until the end. The line is then handed over to her colleague from the corresponding group (A).

Fifth exercise

The female students are divided into two groups, each group consisting of five female students. Group (A) is matched by Group (B) in the form of a locomotive. Each female student holds the hoop and stands at the starting line. When the whistle is heard, the female student starts, performing a rotation with the ball in the form of & and a half rotation of throwing and receiving until The end of the line, in a competitive manner, goes to the last student, and then it is handed over to her colleague from the corresponding group (A).

Sixth exercise

The students are divided into two groups. Each group includes five students. Group (A) is matched by Group (B) in the form of a locomotive. Each student holds the ball and stands at the starting line. When the whistle is heard, the student begins to roll the ball on her arm until it reaches the end of the line and is then handed over. To her colleague from Group A, the interview.

Seventh exercise

The female students are divided into two groups, each group consisting of five female students. Group (A) is matched by Group (B) in the form of a locomotive. Each female student holds the ball and stands at the starting line. When the whistle is heard and the body is rotated by twitching on the balls of the feet twice, the ball is rotated around the waist and then the ball is rotated. Handing it over to her colleague from Group A, the interview

Exercise eight

The female students are divided into two groups. Each group includes five female students. Group (A) is matched by Group (B) in the form of a locomotive. Each student holds the ball and stands at the starting line. When the whistle is heard from the rotation position, she rolls the ball on the arm and then hands it to her colleague from the group (A) Interview.

Ninth exercise

The female students are divided into two groups. Each group includes five female students. Group (A) is matched by Group (B) in the form of a locomotive. Each female student holds the ball and stands at the starting line. When the whistle is heard, with the body rotating on the balls of the feet, the ball is rotated around the waist, then rolled on the arm and thrown. to the top.

Ten Exercise

The students are divided into two groups. Each group includes five students. Group (A) is matched by Group (B) in the form of a locomotive. Each student holds the ball and stands at the starting line. When she hears the whistle, she rolls the ball and performs a rotation until it reaches the end of the line, in a competitive manner, with a specific timing. Then it is handed over to her colleague from the corresponding group (A).