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## Research Paper

## The Effect of Push and Pull Strategy on Innovative Thinking and Some Technical Skills in Volleyball for Female Students of The College of Physical Education and Sports Sciences, Al-Qadisiyah University

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### ABSTRACT

The importance of research lies in the application of push and pull strategies to know its effect on a type of thinking, which is innovative thinking, as well as some technical skills in volleyball for second-stage female students of the College of Physical Education and Sports Sciences, Al-Qadisiyah University, for the academic year (2023-2024), numbering (50) female students representing (2) departments. The researcher used the experimental method in the style of two equal groups to suit its application to the research procedures. The research sample included female students (40) drawn from the drawn departments (A, B). (A) department was the experimental group and (B) department was the control group. Necessary tools and equipment were used in the research and its implementation steps, including the preparation of push-pull strategies, exploratory experiments in the preliminary trials and main field experiments, and the application and implementation of push-pull strategies. Post-test. The researchers concluded that female students urgently need push-pull strategies to develop innovative thinking and some technical skills in volleyball. The researchers recommend using modern and influential strategies in lectures, as they greatly impact innovative thinking and some technical volleyball skills.

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**KEYWORDS:** Innovative, technical skills and Physical Education

### 1. INTRODUCTION

Proper academic planning is an effective way to make progress in all subjects, including sports. Scientific research continues to support reality through research in all areas of life. Technical skills are the backbone of personal development from a social, physical and psychological point of view. The

most important task of education is to develop and clarify the strategy of achieving certain goals of educational units composed of modern educational methods. Modern educational methods and technologies have a lot of focus on combining the success of education with educational courses,

enriching the educational process, developing learners' abilities, focusing attention on the process of interpretation and concentration, understanding and reproduction, and guiding. It is well known that the learning process relies on interaction. On the one hand, the relationship between the subject teacher and the student, on the other hand, the means used for learning and the student's abilities, since one of the most important components for successful learning is the communication between the student and the teacher. The more appropriate the means of communication, the faster and better the learning process will be, saving a lot of energy and time. The same is true for the learning tools used, since they should correspond to the player's level and mental abilities in terms of sensation and perception, thus helping to facilitate and improve the level of performance of sports skills and accelerate the learning of these skills, which helps to reduce the workload and skills.

Innovative thinking is looking at things in a modern and innovative way, i.e. thinking differently and innovatively. Distinguished individuals have the ability and capacity to invent modern methods and mechanisms to address problems and intersections in the educational process, complete assignments and meet difficulties, because they perform their work with a modern and not imitative mindset at times. Thinking creatively can help students move in more productive directions.<sup>[1]</sup> Performing technical skills in volleyball is a cornerstone and a basic pillar on which students' learning and creativity stand. As the technical skills in volleyball are of great importance, teachers spend most of their time practicing the performance and accuracy of skills and learning the correct technical sports skills and giving more time to them in the educational curricula. Therefore, the importance and distinction of this study in preparing push and pull strategies lies in its role in developing innovative thinking and a range of volleyball skills. The theoretical importance of this study lies in establishing a cognitive framework for faculty members in Qadisiya University:

As for the practical importance of this study, it appears through:

- Its results and recommendations, which may help in answering some questions about innovative thinking and some technical volleyball skills.
- Determining the appropriate goals and means that contribute to developing innovative thinking and several technical volleyball skills.
- Showing the importance of the push and pull strategy program, and working to spread awareness among professors of the need to adopt it as one of the modern strategies.

## 2. RESEARCH OBJECTIVES

1. To determine the effects of push and pull strategies on the development of innovative thinking among second-year female students of the Faculty of Physical Education and Sports Sciences at Qadisiya University in the academic year 2023-2024.

2. To determine the effect of push and pull strategies on the technical skills of the volleyball section of secondary female students at the Faculty of Physical Education and Sports Sciences, Qadisiya University in the academic year 2023-2024.

## Research Hypotheses

1. The push-pull strategy positively impacts the volleyball innovative thinking and technical abilities of the second-level female students of the Faculty of Physical Education and Sports Sciences of Qadisiya University in the academic year 2023-2024.
2. The push-pull strategy has a positive impact on the volleyball innovative thinking and technical abilities of the second-level female students of the Faculty of Physical Education and Sports Sciences of Qadisiya University in the academic year 2023-2024.

## Research field

**Human field:** In the 2023-2024 academic year, the field of humanities will be represented by second-year students from the Faculty of Physical Education and Sports Sciences at Qadisiya University.

**Time field:** For the period from 10/10/2023 to 16/3/2024.

**Spatial field:** The stadium of Al-Qadisiyah University, for the academic year 2023-2024.

## 3. RESEARCH METHODOLOGY

The researcher used an experimental method and the method of two equivalent Conduct pre-testing and post-testing of groups appropriate to the nature of the issue, goals, and hypotheses that will lead to a resolution.

### Devices, tools, and means used in the research:

#### Research tools:

1. Research community: The research community comprised the second-stage female students of the College of Physical Education and Sports Sciences, Al-Qadisiyah.
2. 77University, for the academic year (2023-2024), 000777having a total of (50) students representing two different stages of the second stage, which are sections (A, B), numbering (26, 24) female students, respectively. The researcher determined the research sample as (20) The females in section (A) will serve as the experimental group, and the females in section (B) will serve as the control group, and the researcher chose them by lottery in a random manner. The sample percentage from the original community was (80%).
3. Homogeneity and equivalence of the research community members: The procedure of homogenizing and equating the research participants was conducted in the dependent variables, which are both innovative thinking and some technical abilities associated with volleyball (preparing, receiving, sending from below) in the research, demonstrated in Table (1).

Table 1: Shows the homogeneity and equivalence

Variables		Control group		Experimental group		(t) value	Sig.	Levin	Sig.
		Mean	STD	Mean	STD				
Innovative thinking		60.125	4.965	61.375	3.757	0.803	0.428	0.325	0.569
Technical skills	preparation	8.625	1.025	8.375	1.147	0.650	0.521	0.462	0.634
	reception	8.750	0.683	8.625	0.719	0.504	0.618	1.161	0.313
	Send form below	8.125	0.806	8.250	0.683	0.473	0.640	0.735	0.457

### Data collection methods, tools, and devices in the research

1. Paper questionnaire
2. Observation
3. Tests and measurements
4. Measuring tape
5. 10 volleyballs
6. Volleyball court
7. Hand calculator
8. Adhesive tape
9. Lab Tub
10. Office supplies (pens and papers)

### Tests used in the research

#### 1. Innovative thinking test <sup>[2]</sup>

The innovative thinking ability test consists of two sections:

**A. The first section:** Part of one of the Torans batteries for innovative thinking, which is known as (thinking creative of test Minnesota the (about the University of Minnesota, where Torrance worked as an official for the educational research unit and conducted several studies and research using this battery, which was originally derived from the (Geloford) tests to measure the ability to think creatively.

#### This section consists of four sub-tests:

1. **Uses:** The examiner is asked to find out the uses of (tin cans) and (chairs) which he considers to be abnormal the most because these things are more important, it will be divided into two parts. The duration of each lesson is (5) minutes.
2. **Consequences:** requires the candidate to determine what happens when a system of things shifts and changes in a certain way. This test consists of two questions, the first question: (What would happen if a person understood the language of birds and animals?) and the second question (What would happen if a hole was drilled in the ground so that the hole could be seen from the other side?). The time limit for each question is (5) minutes.
3. **Situations:** Examiners are asked to explain the mechanisms of action in a series of scenarios. The test includes two scenarios: What would you do if you were authorized to spend money at a club and one of the club members deliberately planted the impression among colleagues that you were untrustworthy and dishonest? What would you do to educate yourself if all schools did not exist or were closed? Each scenario has five minutes to answer.

4. **Development and Improvement:** This involves asking the candidate to suggest some way of correcting something they are familiar with so that it would be better than it is now (bicycle) (ink pen). The candidate may not suggest any method currently used to improve and develop this thing, nor may he attach importance to whether his suggestion can be implemented at present. Five minutes are allocated for each question.
5. **Correction method:** The first section of the innovative thinking ability test is corrected by estimating (4) points for each examinee for each test, which are:

**A. Intellectual fluency:** It is measured by the ability to determine the maximum number of appropriate answers in a specific period. The characteristics of the appropriate answer are that it is compatible with the requirements of the real environment and thus excludes or neglects any random answer or any answer that may be issued out of ignorance or lack of knowledge.

**B. Spontaneous flexibility:** It can be measured by the ability to give multiple answers that apply to the question. The more different answers there are, the greater the flexibility.

**C. Originality:** It can be measured by the ability to find (new) answers not composed in the group of which it is a part. Accordingly, the degree of originality of the idea becomes high if its statistical frequency is low, but if its frequency increases, its degree of originality is low.

**D. Total score:** This is achieved by testing each level of fluency, flexibility, and originality in the unit. To estimate your score, follow the steps below:

1. Inappropriate ideas that are not based on scientific and logical foundations are excluded.
2. Each idea is given one degree for fluency and one degree for flexibility.
3. As for originality, it is determined through the degree of its repetition.

### Volleyball Tests

#### 1. Verifying the accuracy of volleyball preparation techniques: <sup>[3]</sup>

**Test purpose:** To measure the accuracy level of volleyball preparation techniques.

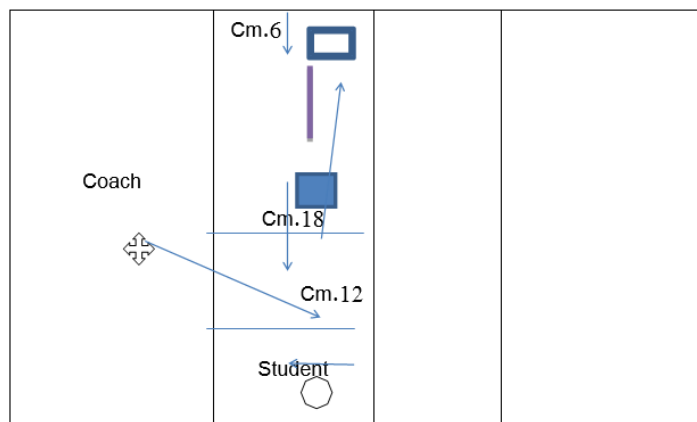


Fig. 1: Performance accuracy test to demonstrate volleyball set-up skills

2. Secondly, test the accuracy of volleyball's ability to receive serve.<sup>[4]</sup>

**Test purpose:** To measure the accuracy of receiving and serving in volleyball games.

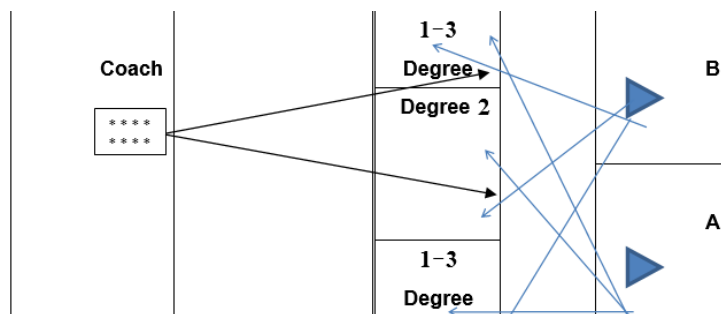


Fig. 2: Performance accuracy test of receiving serve in volleyball

3. Third: Test the accuracy of the downward serve ability facing the volleyball<sup>[4]</sup>

**Test purpose:** To measure the accuracy of bottom-up delivery capabilities.

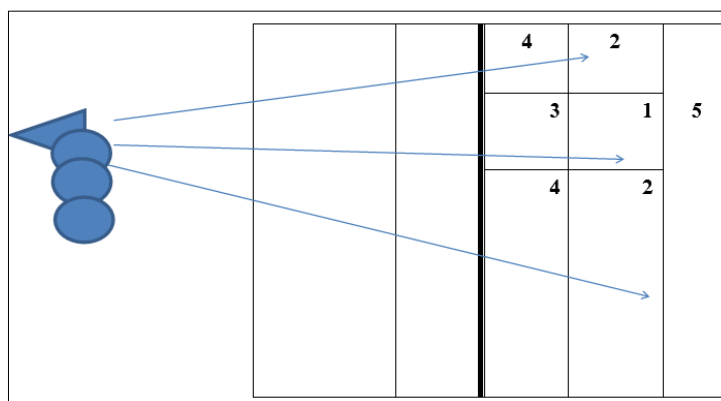


Fig. 3: Performance accuracy test showing the ability to serve from below facing a volleyball

**Scientific foundations of tests**

1. **Apparent validity of the test:** Apparent validity, indicates the degree to which the test corresponds to the phenomenon being measured, i.e., h. Creative thinking and a series of volleyball technical skills (preparation, receiving, serving from below) were determined through a questionnaire that was distributed to (7) experts who

recognized and approved the legitimacy of the test: (The test is legitimate if the following conditions are met). The percentage of the overall opinion of the experts who agree with the statement of the test on the measured phenomenon (100%) is reached. The researcher then collected the data and outputted it using the (Chi2) test. The results showed that the tests were accepted as they

achieved a value higher than the tabulated (Chi2) value (3.84). This applied to the degree of freedom (1) and significance level (0.05).

As shown in Table (2), shows the validity of the test for innovative thinking and technical skills (preparing from below, receiving, serving) in volleyball.

**Table 2:** Demonstrating the effectiveness of the test of innovative thinking and technical skills in volleyball

Tests	Number of answers		Value (Chi-square)		Significance of difference
	Suitable	Not suitable	Calculated	Tabulated	
Creative thinking	5	-	5	3.84	Sig.
Setting	5	-	5	3.84	Sig.
Receiving	5	-	5	3.84	Sig.
Sending form below	5	-	5	3.84	Sig.

## 2. Discriminatory ability of the innovative thinking scale

To clarify and determine the discriminative power of the studied innovative thinking scale, the scale was applied to female students (30) in the second year of the Faculty of Physical Education and Sports Sciences of Qadisiya University, and the test results of the exploratory sample were experimentally compared. For each paragraph of the scale, the (t) test was conducted after two independent samples were divided into two upper groups and one lower group (50%). When the calculated (t) value (between (5.908 - 17.079)) was compared with the table value (2.048), the degree of freedom (28), and the significance level (0.05), the t value was statistically significant and was considered as an indicator of the high discriminative power of the innovative thinking scale.

## 3. Stability

Coefficient of the test used for the study of technical volleyball skills (preparation, receiving, serving from below) by examining the correlation between the test results and the results of repeating the same test for 7 days. By calculating the correlation coefficient (Pearson) between the two tests, it was found that the correlation was significant, and the calculated values of the significant correlation coefficient for the tests (preparation, receiving, serving from below) were (0.916,

0.888, 0.797) respectively, as they were all greater than the table value (0.428 The degree of freedom is (8) and the significance level is (0.05), which confirms that the test tested has the characteristics of high stability, see Table (3). For the stability of the innovative thinking scale, the researchers used the half-split method to extract the correlation coefficient and obtained the stability of the half test, which is (0.771). To obtain a high stability coefficient of the test, the researchers applied the Spearman-Brown equation, and the results showed that the Spearman-Brown value is (0.870).

## 4. Objectivity

The procedures were monitored by the referees and the dedicated team of sports scientists; these procedures were identical to the tests and results were gathered and analyzed statistically. The simple correlation coefficient (Pearson) between the degree of neutrality of the referee was calculated, and the coefficient of significance was determined after comparison to the table's value, the degree of freedom was (8) and the significance level was (0.05) (0, 42). This implies that all of the tests are objective, and their values are greater than the values in the table, which demonstrates the objectivity of the tests as illustrated in Table (3).

**Table 3:** Indicates the degree to which the tests employed in the exploratory experiment are stable

Tests	Stability coefficient	Significance	Objectivity factor	Statistical significance
Settings	<b>0.916</b>	Sig.	<b>0.871</b>	Sig.
Receiving	<b>0.888</b>	Sig.	<b>0.927</b>	Sig.
Sending form below	<b>0.797</b>	Sig.	<b>0.864</b>	Sig.

## Field research procedures

**1. Pre-test:** The pre-test was the investigation's participants (control and experimental) at 9 am on Tuesday, October 28, 2023, at our school gymnasium (volleyball innovative thinking and some technical skills). Faculty of Sports and Exercise Sciences, Qadisiya University. Ensure that the test-related conditions are consistent with the post-test in terms of location, time, instruments employed, methods of implementation, and support.

**2. Push-pull strategy of the Course:** After reviewing previous materials and research, the researcher completed the pre-test of the study at a rate of two classes per week and then applied the push-pull strategy to the research sample. The

course application course was prepared using the push-pull strategy according to the following stages:

### Steps of the push and pull strategy

1. The teacher begins by identifying the questions from the educational content to which the strategy is to be applied.
2. After that, he divides the students into small groups of three to five students, so that these groups are diverse in the knowledge, experiences, and skills of the students.
3. After the division is over, the teacher begins asking the question that he previously identified to the first student in the group.
4. When the first student answers, the teacher moves to listen to the second student's answer without approving or rejecting



the first student's answer and then moves to the third and fourth students, and so on.

5. After the students finish answering, the teacher mentions the correct answer with the student's name, such as saying that the fourth student's answer is correct.

6. After that, he asks the student to re-read her answer clearly and audibly to the rest of the students.

7. Then the teacher repeats the correct answer and asks the students to clap and encourage their colleagues.

8. Finally, he turned to the second group and asked them a different question and the process continued in the same way.

The researcher considered the students' level, the number of courses they were assigned, and the amount of time they were taught, she organized (16) classes in (8) weeks, with two credits per week as the maximum. The course parts are the preparation part, which is 20 minutes, accounting for 20%, and

the total time is 320 minutes; the main class part, which is 70 minutes, accounting for 70%, and the total time is 1120 minutes. The last class lasts 10 minutes, accounting for 10%, and the total time is 160 minutes. From the whole teaching plan.

**Post-test:** The post-test was conducted on the study population after having finished the push and pull strategy application period (8) weeks on Monday, December 22, 2023. The researcher made an effort to describe the conditions of the pre-test and the methods employed during the test.

#### 4. RESULTS AND DISCUSSIONS

Present, analyze, and discuss the differences in volleyball innovative thinking and some technical skills between the control group before and after the test.

**Table 5:** Showing the differences between the control group before and after the volleyball innovative thinking and certain technical skills tests

Variables		Pretest		Posttest		Mean diff.	STD diff.	(t) value	Sig.
		Mean	STD	Mean	STD				
Innovative thinking		60.125	4.965	79.625	7.518	19.500-	7.043	11.075	0.000
Technical skills	Settings	8.625	1.025	11.125	0.619	1.500-	1.461	9.682	0.000
	Receiving	8.750	0.683	14.625	0.719	4.000-	1.549	21.603	0.000
	Sending form below	8.125	0.806	16.125	1.310	5.625-	1.784	25.298	0.000

The tabular value of (t) at the degree of freedom (19) and the associated probability level  $0.05 = 2.093$ .

Within the context of the extracted data for the female students of the study sample (5), the disparity in the value of the variable associated with women's sports (volleyball) innovative thinking and some technical abilities (preparation, receiving, serving) between the pre and post-tests of the control group is evident. The (t) test of associated samples was employed to determine the discrepancy and the calculated

values were (11.075, 9.682, 21.603, 25.298), which is greater than the expected value at the degree of freedom (19) and significance level (0.05). (2.093), which shows that the difference between the pre and post-tests of the control group was significant in favor of the post-test.

Today, discuss the findings of the differences in innovative thinking and technical abilities in the pre-and post-values of the experimental collections.

**Table 6:** Showing the volleyball innovative thinking and some technical ability tests

Variables		Pretest		Posttest		Mean diff.	STD diff	(t) value	Sig.
		Mean	STD	Mean	STD				
Innovative thinking		61.375	3.757	89.625	3.263	28.250-	5.000	22.600	0.000
Technical skills	Settings	8.375	1.147	9.875	0.806	2.500-	1.033	4.108	0.001
	Receiving	8.625	0.719	12.625	1.147	5.875-	1.088	10.328	0.000
	Sending form below	8.250	0.683	13.875	1.204	8.000-	1.265	12.611	0.000

The tabular value of (t) at the degree of freedom (19) and the significance level  $0.05 = 2.093$ .

In the context of the extracted data from the individuals in the research sample, Table (6) demonstrates the differences in the values of the variables associated with innovative thinking and some technical abilities (preparing from below, receiving, serving) between the pre-test and post-test of the experimental group. The discrepancies were isolated using the (t) test of associated samples, and the calculated values were (22,600, 4,108, 10,328, 12,611), which is greater than the tabular value (2,093) of the degree of freedom (19) and the significance level

(0.05), which demonstrates the significance of the difference between the pre-test and post-test of the control group, as well as the difference between the pre-test and post-test of the experimental group.

Present the results of the differences in innovative thinking and some technical skills in volleyball for subsequent measurement, analysis, and discussion of the control and experimental groups.

**Table 7:** Showing the post-test differences between the control group and the experimental group in terms of innovative thinking and certain technical skills in volleyball

Variables		Units	Control group		Experimental group		(t) value	Sig.
			Mean	STD	Mean	STD		
Innovative thinking		Degree	79.625	7.518	89.625	3.263	4.881	0.000
Technical skills	Settings	Degree	11.125	0.619	9.875	0.806	4.919	0.000
	Receiving	Sec.	14.625	0.719	12.625	1.147	5.908	0.000
	Sending form below	Degree	16.125	1.310	13.875	1.204	5.058	0.000

Table (t) value at degree of freedom (38) and significance level  $0.05 = 2.024$ .

Given the extracted data of the individuals in the study sample, Table (7) shows the differences between the control group and the experimental group in volleyball innovative thinking and some technical skills (preparation, receiving, sending from below). The differences were extracted using the independent sample (t) test, and the calculated values were (4.881, 4.919, 5.908, 5.058), with a degree of freedom (38) and a significance level (0.05) of (2.024), indicating the significance of the post-test differences between the control group and the experimental group and the gains of the experimental group.

## 5. DISCUSSIONS

From the observation of the results in Tables (5, 6, 7), it is clear that innovative thinking and some technical skills in volleyball (preparing from below, receiving the ball, serving) were developed in the research sample. This development can be attributed to the people in the control group between the pre-test and post-test, speaking for the post-test, and to the methods used by the teacher of the subject.

Table 6 is caused by the fact that the participants of the experimental group employed the push-pull strategy for the pre-test and post-test, the results were in favor of the post-test when compared to the control group, however, when comparing the experimental group to the control group, the results were in favor of the post-test. The experimental group advocated for the findings of the experimental group in the post-test. The variety and differentiation brought by the second-level students' use of push and pull strategies make the movement responses in the answers different from the traditional rigid solutions because the training methods are in sharp contrast with other methods. Morris Stein pointed out this: "It is possible for innovative activities to increase among many individuals if the environment surrounding them provides, supports, and evaluates innovative activities that show a high degree of flexibility among individuals".<sup>5</sup> This undoubtedly contributed positively to improving performance, as the development of the technical performance of any skill can be obtained through work, repetition and avoiding errors, and this occurs through the student's practical performance under the supervision of the teacher, and this is one of the basic steps used in teaching motor skills. This is what Dhafer Hashem (2002) indicated "It is a natural phenomenon of the learning process that there must be development in learning as long as the teacher follows the correct technical steps for learning, teaching and practicing correct performance and focusing on repeated attempts in a continuous manner until the

performance is consolidated and stable" <sup>[6]</sup>. Any skill, when learned, has a motor program stored in the brain, and when the performance is repeated, it is gradually modified until it moves to acceptable performance with the guidance of feedback and correction of errors to match the motor program stored in the brain with the movement performed. This is what Schmidt (1992) indicated "For every skill we learn, there is a motor program stored in the brain, and the more we use this skill, the more accurate and clear the stored motor program becomes".<sup>[7]</sup> Which led to the emergence of a clear difference in the rates of learning and the performance of the learned skills.

## 6. CONCLUSION

1. The push and pull strategy had a positive effect in developing innovative thinking for second-stage female students in the Faculty of Physical Education and Sports Sciences.
2. The push and pull strategy had a positive effect in learning some technical skills in volleyball for second-stage female students in the Faculty of Physical Education and Sports Sciences.

## 7. RECOMMENDATIONS

1. Physical education teachers must be aware of more than one teaching method and utilize the most effective method for a particular teaching situation.
2. Employ push-pull methods as scientific approaches to teaching other abilities or psychological and physical skills, etc.

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