



The Impact of The Divergent Thinking Strategy on Anticipatory Memory, Preparation Skills, and the Volleyball Wall for Fifth-Graders

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DOI:

[https://doi.org/10.37359/JOPE.V38\(3\)2026.2485](https://doi.org/10.37359/JOPE.V38(3)2026.2485)

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Article history: Received 8/ April/2026; Accepted 27/ April /2026; Available online 28/ September/2026

Abstract

The aim of the research was to build a measure of anticipatory memory in volleyball for fifth-grade preparatory students, prepare educational exercises in volleyball with the strategy of divergent thinking for fifth-grade preparatory students, and identify the impact of divergent thinking strategy in anticipatory memory and the performance of the preparation skills and the volleyball wall in the fifth-grade preparatory, the researcher assumes that there are significant differences between the results of the pre-and post-tests of the experimental and control research groups in anticipatory memory and the performance of the preparation skills and the volleyball wall. There are statistically significant differences between the results of the after-tests of the experimental and control research groups in the anticipatory memory and the performance of the preparation and volley wall skills, and the experimental research approach was adopted by designing the experimental and control groups equally. The research sample amounted to (50) female students from the fifth preparatory grade at Al-mutamizat high school within the formations of the General Directorate of education of Baghdad/Rusafa II, for the academic year (2023/2024). 26.596% of the population was randomly selected. Two survey and construction samples were also selected from this community, each of which had specific actions, and after building the research scale, (8) practical lessons were prepared with the strategy of divergent thinking applied to the students of the experimental group over (8) weeks at a rate of one lesson per week. The total duration of the research procedures was from (18/2/2024) until (23/4/2024), and after the end of the research experiment, the results were statistically processed by the SPSS system to form conclusions that the construction of the proactive memory meter in volleyball has the conditions, foundations and scientific parameters for its acceptance and is suitable for fifth grade preparatory students. The preparation of educational exercises with the strategy of divergent thinking in practical lessons in volleyball suits the fifth grade students, and that the application of educational exercises with the strategy of divergent thinking in practical physical education lessons helps to improve the level of anticipatory memory in volleyball, and helps to improve the performance of the skills of preparation and the wall of resistance in volleyball to complete educational tasks taking into account the improvement of the level of Anticipatory memory with volleyball as the supporting mental factor for the performance of these two skills.

Keywords: divergent thinking strategy, anticipatory memory, preparation skill, blocking wall skill, volleyball

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Introduction

"Divergent thinking is a mental skill and an important factor for the creativity of any individual, as it represents the mental and intellectual ability to generate creative and innovative ideas, especially in lessons that teach the skill and ability to perform tasks." (Al-Mahdi, 2022, p. 15). Furthermore, "the idea of divergent thinking, according to the (Gale) Encyclopedia of Psychology, was developed by the scientist (Guilford), who sees divergent thinking as an essential component of creativity and links it to four main characteristics: fluency, originality, elaboration, and creativity." (Al-Hayek, 2018, p. 73). Divergent thinking is characterized by being multi-faceted thinking that increases the possibility of thinking from multiple and diverse angles, directions, and perspectives to integrate them, in order to form a comprehensive subjective vision of all elements of the situation. It is a type of unconventional thinking, whose effectiveness is demonstrated when it is provided with a suitable, rich, and stimulating environment. The learner adopts it when dealing with problems or questions that have more than one correct solution. It is characterized by being free and open, and its goal is to reach the largest possible number of ideas, connections, or solutions. It helps prepare the brain for learning by issuing distinctive connections to the neural network in the brain. It is based on the philosophy and thought of brain theories, including the hemispheric theory of the brain, and is evidenced by the flexibility of thought. And the occurrence of atypical divergent responses. X. The greatest degree of connection occurs between ideas and topics related to the subject, and helps generate many different ideas and responses to the subject, and develops the ability of creativity in learners, and is associated with a type of question that arouses the desire to research and explore, and encourages experimentation and independence." (Abu Al-Rayyat, 2019, p. 135). The researcher also sees that just as there is no motor behavior without motivation, there is no skillful motor performance in volleyball unless it is based on thinking with knowledge of how to perform the details of the skill in accordance with the parameters of its model, and due to the specificity of the transitions between body movements and the consistency of these movements in each of the volleyball skills that require appropriate control and mastery to produce this specific skill in the required manner. This requires directing the specificity of thinking towards what fulfills that cognitive familiarity with the information of its performance. Hence, it is necessary to delve into research on strategies that achieve two basic purposes in volleyball teaching methods, namely supporting the cognitive structure and thinking with knowledge of performance and improving this performance. One of these strategies that can be tried is the divergent thinking strategy, as the divergent thinking strategy is defined as "a set of steps, procedures and processes followed by the teacher that allow the learners' thinking to diverge by creating new connections between the nerve cells that make up the brain structure, and contributes to opening new paths of thinking with flexibility and multiple perspectives and the issuance of divergent responses." (Ahmed, 2018, p. 89). "The importance of applying the divergent thinking strategy for female students lies in the fact that it enables them to connect ideas, concepts, information, and facts, which is evident in their ability to address problems and situations, and to produce the largest possible number of appropriate ideas, images, and expressions in a specific time unit. It helps students assess their level of understanding and know how far they are progressing in the learning process. It also provides them with feedback, develops positive attitudes among students through problem-solving, working on projects, tests, and assessment systems, and increases students' ability to receive, comprehend, and represent knowledge, integrate it into their mental structure, link it to their previous experiences and knowledge, and employ it in skill performance." (Salman and Al-Shammari, 2017, p. 129)

The researcher believes that storing and encoding knowledge in a way that suits the educational situation when teaching with the divergent thinking strategy must be compatible with the type and specificity of performing the two defensive skills in volleyball, namely the skills of setting and blocking, considering that preparing the body is necessary to anticipate the event before implementing these two skills of a changing nature, whether in receiving the ball to set it up, or when hitting the ball to block it. Here, memory has several divisions according to what the literature indicated in this regard, the most important of which are long-term memory, short-term memory, and the linking memory between them, which is the working memory that pertains to the momentary situation of performance. However, what is related to the experiences of recalling, remembering, and forgetting the requirements of skill performance before starting the performance and anticipating it by preparing mental processes or positioning the body to complete it correctly is the domain of anticipatory memory. This calls for research into the potential of this memory to support the desired improvements. Moreover, "memory is considered one of the basics of life for the individual, considering that its importance does not lie only in daily work and academic performance, but rather it is the storage of all his experiences throughout his life according to his specialization in every aspect of life from childhood to old age and all the events he has gone through." The functions of memory may be numerous and work together to produce a specific process. If we wish to understand how this process becomes possible, and what its conditions might be in detail, we must study what precedes it and perhaps also what follows it in the evolving life of the human being. Remembering is not a function entirely independent and completely distinct from the process of perception, the process of conceptualization, or even the processes of constructive thinking, but it has fundamental relationships with all of them. (McAulley, 2010, p. 78). Furthermore, cognitive processes play a major role in behavior, as Bandura believes that the main function of thoughts is to enable the individual to predict events and develop methods that help control what happens in his life. (Al-Saadawi, 2021, p. 166). Furthermore, "prospective memory is a form of memory that means the ability to remember to do something at a specific moment at a later time. Although there is a significant deficit related to many everyday life situations in prospective memory tasks in laboratory studies, some experiments have shown that there are clear differences between individuals in performing these normal tasks that are carried out in daily life. Through these research studies, many solutions have been found for this problem related to many variables such as age, gender, etc." (Henry, 2004, p. 31). Prospective memory is also defined as the ability to remember to perform a planned action at a later time. There are two types of prospective memory: (Einstein & Mcdaiel, 2005, p. 327).

1. Self-encoding memory: This involves remembering to perform intended actions in advance, relying on internal or subjective stimuli. It is often associated with time-based anticipatory memory tasks that occur at a later time. Two types of encoding are identified: symbolic and pictorial.

2. Environmental encoding memory: This refers to remembering to perform intended actions in advance, relying on external stimuli. It is often associated with event-based anticipatory memory tasks.

Likewise, anticipatory memory was divided by (Modaniel & Einstein) into three basic dimensions: (Khafaji, 2005, p. 56) The first dimension: Time-based anticipatory memory: This dimension requires the learner to remember to perform an action he intended to perform at a certain time or after a certain period of time, for example, remembering to meet someone at a later time. The second dimension: Activity-based anticipatory memory: This requires the

learner to remember to perform a certain action after finishing a current activity, for example, remembering to buy some things after finishing work or trying to memorize about it. The third dimension: Event-based anticipatory memory: This depends on the learner remembering to perform an action when a certain external event occurs. In this dimension, intentions are recalled when a target event occurs during an activity, for example, remembering to tell a friend something when seeing it. Anticipatory memory has a hypothetical meaning and another, implicit meaning in the form of a distinctive concept of memory. This concept is vague and insufficient to describe the memory processes of remembering future actions, which also include the elements of shaping, storing, and retrieving actions intended for a later time. She pointed out the use of the term "perceiving deferred blood money." (Scullin & McDaniel, 2010, p. 1029) One model of anticipatory memory is the preparatory attention and memory processes model. This model assumes that retrieval from anticipatory memory is mediated by non-automatic processes of preparatory and attentional memory. When the anticipatory memory task is not important, and the target events exist beforehand, and there is a connection between the event, the target, and the intended action, the activity develops to deduce the focus of the target events processes and the attentional preparatory processes to be occupied with the development of activity in the anticipatory memory task. Anticipatory memory processes appear when the anticipatory memory target is discovered by means of attentional preparatory processes. One of these processes is monitoring the targets that indicate their suitability for accomplishing the intended action. Despite all these justifications allowing for the retrieval from anticipatory memory to be mediated by monitoring goals or cues that indicate when the anticipatory memory task will be performed (Spiller, 2010, p. 62), "considering that remembering and forgetting are often opposites of performing most tasks, the delay in their execution involves the concept of anticipatory memory. Usually, the period between the formation of a delayed intention and the opportunity to execute it is filled with ongoing tasks unrelated to that intention, which are not perceived during that period and must be retrieved from memory" (Bouti, 2012, p. 56). This highlights the importance of divergent thinking in teaching the skills of setting and blocking in volleyball. Given the importance of anticipatory memory in preparing for and performing these two skills, modern physical education teaching methods call for a balance between acquiring knowledge of skill performance, mental development, and practical application in volleyball lessons. This allows for the easy achievement of educational objectives based on the principles of economy, simplicity, and clarity. Through the researcher's academic work in physical education teaching methods, specifically for volleyball, and through repeated field visits to physical education classes in preparatory schools, she observed a persistent weakness among fifth-grade preparatory students at the beginning of their instruction in the skills of setting and blocking in volleyball, especially since they are beginners. The lack of reliance by female teachers on the mental measurement of female students, represented by this factor of anticipatory memory that supports the performance of these two skills when teaching them, made this problem necessary for the availability of a specialized measurement tool for this memory that is specific to the practical lesson of volleyball for fifth preparatory grade students, and employing the elements of the strategy under experimentation with practical application in various educational situations in the physical education lesson for the students to practice it, so the research aims to build an anticipatory memory scale in volleyball for fifth preparatory grade students, and prepare educational exercises in volleyball with the divergent thinking strategy to teach fifth preparatory grade students. The study aimed to identify the effect of the divergent thinking

strategy on anticipatory memory and the performance of the skills of setting and blocking in volleyball among fifth-grade preparatory students. The researcher assumed that there were no statistically significant differences between the results of the pre-tests and post-tests for the experimental and control research groups in anticipatory memory and the performance of the skills of setting and blocking in volleyball, in favor of the post-tests. There were no statistically significant differences between the results of the post-tests for the experimental and control research groups in anticipatory memory and the performance of the skills of setting and blocking in volleyball, in favor of the experimental group.

Research Community and Sample

The researcher adopted the experimental research method with the design of two equivalent experimental and control groups. The research community was defined as the fifth preparatory grade students in the Distinguished Secondary School within the formations of the General Directorate of Education of Baghdad/Al-Rusafa II, for the academic year (2023/2024), whose total number is (188) students, and they are naturally distributed over six sections, (31) students in section (A), (31) students in section (B), (30) students in section (C), (32) students in section (D), (32) students in section (E), (32) students in section (F), and after excluding (8) students who do not meet the research purposes, (10) students were randomly selected from the students of section (B) for the pilot experiment sample, representing (5.319%) of this community. (120) female students were randomly selected to represent (63.83%) of this population for the sample to construct the volleyball anticipatory memory scale from the six different sections after determining their number based on the assumption that each item of this scale would have (5) female students, which has (24) items. As for the main application sample in this research, it is from the remainder of these six sections, and from two sections, to reach (50) female students, which is (26.596%) of this population. One of them was randomly selected to be the experimental group from section (C) and the other from section (A) as the control, with (25) female students for each of them. They are from the same academic stage and age, and they studied volleyball within their prescribed curriculum in their academic stage, and they are homogeneous in anthropometric measurements.

Method and Procedures

Due to the lack of a specialized scale to measure anticipatory memory in volleyball for fifth-grade preparatory students specifically, the researcher resorted to building this paper scale by adopting the construction steps with systematic field procedures and several statistical treatments. She prepared (24) statements based on the theoretical reference framework of the concept of anticipatory memory and the specificity of the research direction in methods of teaching physical education. The statements of these items were closed with three alternatives in the positive direction only (always applies to me, sometimes applies to me, never applies to me) with an answer key (3, 2, 1) with the instructions for answering and specifying its name as the anticipatory memory scale in volleyball for fifth-grade preparatory students. This closure and specifying the answer key was done after conducting the interview with experts. Face validity of the scale: The researcher prepared a paper questionnaire to survey experts regarding the inclusion of this scale. This questionnaire was presented to (25) experts in teaching methods, volleyball, sports psychology, and testing and measurement. They unanimously agreed (100%) to retain all items as they were, without modification, deletion, or merging. Thus, both face and logical validity were confirmed.

Pilot trial

The scale was piloted with (10) female students on Sunday, February 18, 2024. The average time for completing the scale was (11) minutes.

The structural validity of the scale

Its form was applied to a construct sample of 120 students to verify the discriminatory ability of the items by adopting the method of two symmetrical groups of equal size, by determining a percentage (27%) of the construct sample number for each of the two groups, which amounted to (32.4) for each group, which was rounded to (32) to adopt this number for each of the two groups. Their scores were statistically analyzed using the t-test for uncorrelated samples, as shown in the results of Table (1)

Table 1. shows the results of the discriminative ability of the volleyball proactive memory scale for fifth-grade preparatory students

period	group	No.	Statistical comparison of the scores of the two terminal groups of the construction sample				Deference	Acceptance
			Arithmetic mean	± Standard deviation	(t)	(Sig)		
1	higher	32	2.97	0.177	20.506	0.000	Significant	Acceptable
	lower	32	1.25	0.44				
2	higher	32	2.72	0.457	11.706	0.000	Significant	Acceptable
	lower	32	1.34	0.483				
3	higher	32	2.94	0.246	17.302	0.000	Significant	Acceptable
	lower	32	1.31	0.471				
4	higher	32	2.69	0.471	10.563	0.000	Significant	Acceptable
	lower	32	1.41	0.499				
5	higher	32	2.91	0.296	15.087	0.000	Significant	Acceptable
	lower	32	1.38	0.492				
6	higher	32	2.66	0.483	9.88	0.000	Significant	Acceptable
	lower	32	1.44	0.504				
7	higher	32	2.88	0.336	12.771	0.000	Significant	Acceptable
	lower	32	1.5	0.508				
8	higher	32	2.63	0.492	8.132	0.000	Significant	Acceptable
	lower	32	1.63	0.492				
9	higher	32	2.84	0.369	12.405	0.000	Significant	Acceptable
	lower	32	1.47	0.507				
10	higher	32	2.59	0.499	8.225	0.000	Significant	Acceptable
	lower	32	1.56	0.504				
11	higher	32	2.81	0.397	11.521	0.000	Significant	Acceptable
	lower	32	1.5	0.508				
12	higher	32	2.56	0.504	8.16	0.000	Significant	Acceptable
	lower	32	1.53	0.507				
13	higher	32	2.78	0.42	10.299	0.000	Significant	Acceptable
	lower	32	1.59	0.499				
14	higher	32	2.53	0.507	7.072	0.000	Significant	Acceptable
	lower	32	1.66	0.483				
15	higher	32	2.75	0.44	9.644	0.000	Significant	Acceptable
	lower	32	1.63	0.492				

16	higher	32	2.5	0.508	6.635	0.000	Significant	Acceptable
	lower	32	1.69	0.471				
17	higher	32	2.72	0.457	8.641	0.000	Significant	Acceptable
	lower	32	1.75	0.440				
18	higher	32	2.47	0.507	6.217	0.000	Significant	Acceptable
	lower	32	1.72	0.457				
19	higher	32	2.69	0.471	8.124	0.000	Significant	Acceptable
	lower	32	1.78	0.42				
20	higher	32	2.44	0.504	5.377	0.000	Significant	Acceptable
	lower	32	1.84	0.369				
21	higher	32	2.88	0.336	18.366	0.000	Significant	Acceptable
	lower	32	1.19	0.397				
22	higher	32	2.63	0.492	11.324	0.000	Significant	Acceptable
	lower	32	1.28	0.457				
23	higher	32	2.22	0.42	7.737	0.000	Significant	Acceptable
	lower	32	1.34	0.483				
24	higher	32	2.31	0.471	7.788	0.000	Significant	Acceptable
	lower	32	1.38	0.492				

It is accepted to distinguish a paragraph if the degree (Sig) > (0.05) is at the level of significance (0.05) and the degree of freedom (62)

To find the internal consistency that complements the verification of the construct validity of the scale, simple Pearson correlation coefficients were calculated to calculate the relationship between the score of each item of the scale and its total score by means of statistical treatments of the scores of its application to the students of the same construct sample, which numbered (120) students, as shown in the results of Table (2)

Table 2. shows the values of the internal consistency correlation coefficients for the correlation of paragraphs with the total score of the volleyball anticipatory memory scale for fifth-grade preparatory students

No.	The correlation coefficient between the paragraph and the total score of the scale	(Sig)	No.	The correlation coefficient between the paragraph and the total score of the scale	(Sig)
1	0.771*	0.000	13	0.559*	0.000
2	0.547*	0.000	14	0.733*	0.000
3	0.461*	0.000	15	0.555*	0.000
4	0.516*	0.000	16	0.622*	0.000
5	0.539*	0.000	17	0.632*	0.000
6	0.723*	0.000	18	0.706*	0.000
7	0.641*	0.000	19	0.599*	0.000
8	0.529*	0.000	20	0.441*	0.000
9	0.661*	0.000	21	0.657*	0.000
10	0.644*	0.000	22	0.575*	0.000
11	0.726*	0.000	23	0.673*	0.000
12	0.616*	0.000	24	0.588*	0.000

The consistency of the paragraph is accepted if the degree (Sig) > (0.05) is at the degree of freedom (118), the level of significance (0.05)

Scale reliability and suitability: Statistical reliability was verified by using the same application scores on the (120) female students in the construction sample, using Cronbach's alpha coefficient, which reached (0.872) at a degree of freedom of (118) and a significance

level of (0.05). Statistical verification of the scale's suitability for fifth-grade preparatory students was also carried out using the skewness coefficient to verify the normal distribution, as shown in the results of Table (3)

Table 3. shows the final statistical parameters and values of the normal distribution of the students of the scale construction sample

Scale	No.Paragraphs	Total grade	Arithmetic mean	Standard deviation	Torsion
Proactive memory in volleyball for fifth-grade Junior High students	24	72	44.16	1.82	-0.409

The number of students is (120), the normal distribution is moderately dependent if the torsion value is specified between (1 +)

After this procedure, the researcher completed the construction of the volleyball anticipatory memory scale for fifth grade students to be in its final form (Appendix 1) with a total score ranging from (24-72) and a hypothetical average (48).

To measure the performance of the preparation skills and the volleyball wall, the researcher adopted a form to evaluate the performance of the tested student in each of the skill tests without accuracy after photographing them, and judging the degree of technical performance by the mediation of the three experts, the grade distribution is as follows:

- The preparatory section: and its degree (3).
- The main section: and its degree (5).
- The final section: and its Grade (2).

In order to apply the strategy of divergent thinking in teaching the performance of the preparation and blocking skills in volleyball to the experimental group, the principles and steps of the strategy were employed in educational exercises for the practical physical education lesson of volleyball in the educational and applied aspects, by defining the roles for both the student and the school, as follows: The role of the student in applying the strategy of divergent thinking is determined by the fact that she " deliberately responds to the questions that the school is discussing with them and does the answers by investing proactive memory on the performance of the preparation skills and the volleyball wall to reach the results and the consequences of them.

The student realizes the links and relationships between the details of the performance of the preparation skills and the blocking wall in volleyball by investing in raising the level of proactive memory through the practical practice of educational situations with the strategy of divergent thinking, and deliberately cooperates, synergizes, searches for knowledge, forms mental models and encodes them in the proactive memory of what has been learned to perform and looking for similarities and differences between the elements in The topics presented in the practical lesson". (Isa, 2017, p. 27)

As for the school's role in applying the strategy of divergent thinking in the practical lesson, it "encourages students to flow different ideas without interrupting or quarantining any idea in it, and continuous reinforcement to support proactive memory and follow the student with consecutive questions about the performance of the preparation skills and the volleyball wall to help her generate different ideas and search for good answers to these questions. She deliberately navigates by asking successive questions in one practical lesson, depending on the

nature of the performance of the preparation skills and the volleyball wall, the time set for each of them in this lesson, the effectiveness of the students and the requirements of the educational situation.

It also directs students to monitor their thoughts by investing in improving the level of proactive memory in volleyball and practicing arranging and organizing their thoughts according to certain axes, and creates the right atmosphere for understanding knowledge of performance through interaction and developing the spirit of cooperation between students within the practical lesson through Group Discussion and allowing questions from each student, and raising their motivation level.

As well as providing students with appropriate comments on their opinions on the performance of their colleagues in the tasks assigned to them, clarifying and explaining what they need by investing proactive memory, speaking in clear terms and providing them with feedback on the performance of preparation and the volleyball wall, (Al-Khafaji, 2018, P. 249)

In the educational aspect, the school explains and displays the skill specified in the lesson, explains to the students the details of proper performance, and then performs a demonstration of the model of this skill without a ball and with a ball for several times, and instructs the teacher to draw the motor program after thinking about how to perform the skill to come up with original ideas when performing the skill in the applied aspect later.

By integrating ideas to be integrated by linking the details of performance, the school emphasizes the exchange of knowledge between students and providing an atmosphere of freedom to be able to express their opinion while respecting the opinions of their colleagues.

As for the Applied side, the content of educational tasks for cooperative exercises, the strategy of complex thinking in the lesson includes the performance of both skills according to the specificity of each of them, gradually from easy to difficult and varied in their content, and each group is asked to evaluate performance monitoring or express views and ideas among them, and each group is given (2) two minutes before the first application only, the school monitors the performance of students in groups equally, diagnoses common mistakes and corrects the school with feedback on the performance of students in each group and helps raise questions and conversations between them, while allowing by asking questions and exchanging ideas learned in the practical lesson.

Each of the two skills was allocated (4) practical lessons by adopting the curriculum scheduled in the second semester of the academic year, applied at the rate of one lesson per week on Sunday of each week, as the application of practical lessons continued with the strategy of divergent thinking (8) weeks, to be applied in the main section of (30) minutes of the time of the practical lesson of Volleyball of (45) minutes, as the time of the main section is distributed for (5) minutes for the educational side and (25) minutes for the Applied side, in which (4) exercises are allocated for each exercise of (4) minutes practical practice as the students take a two-minute time-out at the beginning of the repetitions of each exercise, i.e. before the first repetition only For discussion and rest in between (1) minutes, the parts of which were distributed transiently between the four exercises (Appendix 2). The remaining time of the practical lesson for both the preparatory section of (10) minutes, and the final (5) minutes is left to the subject school without the intervention of the researcher.

Also, after creating a scale and tests of the three dependent variables and preparing educational exercises for all educational positions of the divergent thinking strategy, the researcher conducted the second exploratory experiment on Thursday morning, corresponding to the date (29/2/2024) at Al-mutamizat High School, on (10) female students who identified

the exploratory sample from outside the main research sample, and the researcher did not face any significant obstacles.

The research experiment began by applying the tribal tests to the female students of the application sample, represented by the experimental and control research groups of 50 female students, to measure each of the dependent variables by applying the scale by direct measurement, and filming the two Tests of volleyball skill, on Sunday corresponding to the date (3/3/2024) in that same high school.

The strategy of divergent thinking was also applied to the students of the experimental group for the period from Monday corresponding to the date (4/3/2024) until Monday corresponding to the date (22/4/2024), the students of the control group studied in the educational style followed in their lesson, and it was followed that they took the same time and number of lessons to learn the performance of the skills of preparation and 23/4/2024).

After the end of the research experiment, the results were processed with the SPSS system to calculate the percentage values, the arithmetic mean, the standard deviation, the torsion coefficient, the correlation coefficient (Pearson simple), the Alpha Cronbach coefficient, the variance smoothing test (Liven), the (t-test) Test for non-correlated samples, and the (t-test) Test for correlated samples.

Results

Table 4. shows the results of the tribal tests between the two research groups

Dependent variants	Smoothing the contrast for the application sample		Group	Comparison of statistical parameters between the two groups in the degrees of tribal measurement				Significance of the difference
	Levin's value	(Sig)		Arithmetic mean	Standard deviation	t-test	(Sig)	
Anticipatory memory with volleyball	0.419	0.521	Empiricism	43.8	1.871	1.368	0.178	Non
			Control	44.52	1.851			
Perform the skill of front setting from above the head	0.296	0.589	Empiricism	2.16	0.898	1.371	0.177	Non
			Control	1.8	0.957			
Performing the repelling wall skill	0.697	0.408	Empiricism	2.52	1.046	1.169	0.248	Non
			Control	2.88	1.13			

Is not D if < (Sig) (0.05) is at a sign level of (0.05) and a degree of credibility of (N1+ n(2-2 = 48

Table 5. shows the results of the pre-and post-tests of the experimental and control research groups

Variants	Group no.	Measureme nt	Comparison of statistical parameters between the degrees of tribal and dimensional measurement of each group						differen ce
			Arithmet ic mean	Standar d deviatio n	Average differenc es	Deviation of differenc e	(t)	(Sig)	

Anticipatory	Empiricism (25)	Pre	43.8	1.871	17.4	2.082	41.793	0.000	significant
		post	61.2	0.707					
	control(25)	Pre	44.52	1.851	7.48	2.584	14.474	0.000	significant
		post	52	2.082					
Perform the	Empiricism (25)	Pre	2.16	0.898	5.52	1.262	21.865	0.000	significant
		post	7.68	0.802					
	control(25)	Pre	1.8	0.957	3.52	1.085	16.225	0.000	significant
		post	5.32	0.69					
Performing	Empiricism (25)	Pre	2.52	1.046	5.44	1.261	21.571	0.000	significant
		post	7.96	0.79					
	control(25)	Pre	2.88	1.13	2.6	1.225	10.614	0.000	significant
		post	5.48	0.653					

The statistical difference significant for each group was (Sig) > (0.05) at the level of significance (0.05) and the degree of credibility (N)-(1)

Table 6. shows the results of the post- tests between the two research groups

Dependent variants	Group no.	Arithmetic mean	Standard deviation	t-test	(Sig)	Significance of the difference
Anticipatory memory with volleyball	Empiricism (25)	61.2	0.707	20.924	0.000	Significant
	control(25)	52	2.082			
Perform the skill of front setting from above the head	Empiricism (25)	7.68	0.802	11.15	0.000	Significant
	control(25)	5.32	0.69			
Performing the wall skill	Empiricism (25)	7.96	0.79	12.101	0.000	Significant
	control(25)	5.48	0.653			

The statistical difference significance was (Sig) > (0.05) at the level of significance (0.05) and the degree of credibility (N1 + N2-2) = (48).

Discussion

From the review of the results of the pre-and post-tests listed in Table (5), it is clear that there is a clear improvement in both anticipatory memory and the performance of the preparation and blocking skills with volleyball among the female students of both the experimental and control research groups, and from the review of the results of the post-tests listed in Table (6), it is clear that the female students of the experimental group outperform in these improvements in both anticipatory memory and the performance of the preparation and blocking skills with volleyball, and the researcher attributes the appearance of the experimental group's results to the active and positive role of educational tasks in which the vocabulary of the divergent thinking strategy was employed in creating an environment didactic in the physical education lesson is characterized by interacting with practice and practical application with ease and simplifying the details of skill performance by providing students with the opportunity to anticipate cognitive information about that performance by discussing students among themselves, which made it easier for them to encode this information to support proactive memory.

The strategy of divergent thinking also helped to increase the students' awareness of the connections and relationships between the information and movements of the skill specified in the lesson through the practical practice of educational exercises in cooperation and collaboration between them, which facilitated them to form mental models and encode them in this type of memory, which helped to invest similarities with educational situations in practical lessons and over (4) practical lessons for each skill, which common mistakes that accompany the initial stages of learning a skill include By investing the detailed information about performance that they get with divergent thinking.

The researcher also attributes the appearance of these results for both proactive memory and the performance of the preparation and blocking skills in volleyball to the fact that the divergent thinking strategy helped encourage students and enable them to invest the flow of ideas without interruptions or restrictions on any idea that serves and facilitates the performance of the skill, and to the role of continuous school cooperation between students through Group Discussion 'Being honest with their questions, raising their motivation level, clarifying and explaining what they need to support their anticipatory memory, which increases their role in the lesson and interaction between them or by relying on themselves in the performance of skills.

"The principles of the strategy contribute to deepening and expanding the complex thinking in the educational process, as it is necessary to ask various questions, to clarify and simplify the vague and complex questions of students, to strengthen the principle of cooperation and participation among students in the formation of ideas, work to link them together, and provide justification and clarification for each idea raised because the solutions may lie in the outcome of these ideas, even if they are simple". (Abu Rumiya, 2019, P. 326)

"Modern research shows that memory is central to all cognitive processes in an individual and is of paramount importance and importance for its use in all subsequent activities that require the information processing system, processing and storing stored information, and is one of the most influential of all other cognitive processes (perception, attention, thinking), whatever their nature benefits from the use of these activities, and the other remaining processes are affected by memory based on their cognitive stores," (Badawi, 2018, P. 23)

"This has taken the interest of many scientists and researchers in the field of cognitive psychology to describe memory, its components and factors affecting it, and the nature of the performance of those processes of receiving, organizing, storing and processing information, through the multiple models that have been put forward. (Al-Qaisi, 2008, p. 114)

In addition, "studies conducted on memory activation levels indicate that anticipatory memory intentions are stored in a higher state of activation than other memory contents, as research has shown that after encoding the anticipatory memory intention, participants are faster in responding to words associated with their intention during recognition and decision tasks. (Scullin & Other, 2009, P: 426)

"Preparing learners who possess scientific thinking skills and are characterized by the ability to solve problems, make decisions and deal with various life situations knowingly and skillfully will only come by deepening the processing of scientific knowledge and linking the new knowledge gained with the previous knowledge in the learner's cognitive structure (Hassan & aldsouki 2022, 5)

"Group seminars can be organized where learners share experiences and advice among themselves, teachers can guide the discussion and provide technical supervision, and team

performance indicators can be used and evaluated regularly to measure continuous improvement and identify areas that need to be developed,". (Harvey & Other, 2019, P: 485)

Considering that "the environment surrounding the individual has a clear influence or perhaps it depends most of his thinking and determines it, and whenever the environment is psychologically healthy, sound thinking will be a supportive birth for her, and on the contrary, a weak environment or full of unstable events may lead to disturbances in the thinking of the individual towards that environment". (Mikhail, 2022, P. 42)

"When diverse ideas and innovative experiences are exchanged, an environment can be created that encourages innovation in the application of volleyball skills. students can be inspired by other people's ideas to try new and effective methods," he said. (Capranica& Other, 2020, P: 165)

Feedback is one of the most important factors that determine the learning of motor skills and the development of motor performance, as most research has shown that feedback increases the improvement of performance in the early stages of learning. (Hassan & Musharef 2024, 473)

Also, "there can be mutual dependence between each member of the cooperating group, through the mediation of common goals on which each member of the group depends on the rest of the group in achieving them, and this is called the internal mutual dependence of goals". (Asaad, 2017, p. 77)

"Thinking about performance leads to the activation of new connections between neurons, easily through new pathways that it did not have before, and in a way that helps to provide a new possibility for the mind to do more mental work, and leads the mind to work with better potential, more broadly and efficiently,". (Carmen & Other 2017, 42)

"Training and practice on a particular skill within a motor duty leads to increased experience and development in the performance of skills, so practice is the most important variable in the learning process for complex and even simple skills. (Mtanish 2020, 25)

"finally the learner must learn how to self-evaluate his skillful performance, relying on himself to master that performance, as self-evaluation can identify areas that the individual needs to improve and develop to improve performance. (Al-Aboudi, 2019, P. 77)

Conclusions and Recommendations

1. The construction of the volleyball anticipatory memory scale has the conditions, grounds and scientific parameters for its acceptance and is suitable for fifth-grade preparatory students.
2. The preparation of educational exercises with the strategy of divergent thinking in practical volleyball lessons is suitable for students of the fifth junior grade.
3. The application of educational exercises with the strategy of complex thinking in practical physical education lessons helps to improve the level of proactive memory in volleyball among the students who study with it, and to outperform the students who study without it.
4. The application of educational exercises with the strategy of complex thinking in practical physical education lessons helps to improve the performance of the preparation skills and the wall of resistance in volleyball among the students who study with it, and to outperform the students who study without it.
5. When preparing educational exercises for the strategy of complex thinking, it is necessary to have a space of freedom to think and activate the mind and body to complete educational tasks, taking into account the improvement of the level of anticipatory memory with volleyball as the mental factor supporting the performance of these two skills.

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