



Effect Of Using Memory Compression Method To Learn Some Basic Volleyball Skills

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Abstrak

This study aimed to identify level of basic volleyball skills among students at College of Physical Education and Sports Sciences, University of Wasit; develop specific exercises based on memory compression method to teach some basic volleyball skills to students at College of Physical Education and Sports Sciences, University of Wasit; and determine effect of these specific exercises based on memory compression method on teaching some basic volleyball skills to students at College of Physical Education and Sports Sciences, University of Wasit. The researcher used an experimental method with a single-group experimental design, success of research in its natural form requires a sound and well-chosen research community and sample. The community consisted of third-year female students at College of Physical Education and Sports Sciences, University of Wasit, a single-group experimental design were used, sample consisted of 16 female students from section A, third year, who were selected randomly, experimental group consisted of only 16 female students, the researcher conducted pilot study on a sample of 6 female students from same year at College of Physical Education and Sports Sciences, University of Wasit from same division but from outside main sample, percentage of sample as a whole from its original community was 44.44% out of 45 female students. Results showed that memory compression technique has an effect on learning some basic volleyball skills, memory compression technique gave students opportunity to discover their true ability to utilize minimal information to acquire the greatest possible knowledge, memory compression technique activated process of storing information in short, medium, and long-term memory more effectively, and this was observed through their skill performance after theoretical explanation. Recommendations that adopt memory compression techniques that the researcher used it because it is an exercise that is appropriate for ages close to level of sample, diversifying introduction of new exercises that serve students in learning process and make a leap in student's understanding and speed of learning, refining selection of exercises accurately which helps in development of skill performance well, working on taking into account previous studies and applying recommendations and suggestions because some of these recommendations advise completing work that they started, conducting research for similar studies and different samples in a broader and more comprehensive way.

Keywords: Memory Compression, Education Methods, Volleyball Skills

INTRODUCTION

The teaching and learning process is one of the most complex processes in education because it involves the interaction of teachers, learners, learning materials, teaching methods, and individual characteristics. When initiating the teaching process, a teacher or educator must determine an appropriate curriculum and select teaching methods or strategies that correspond to the characteristics and student learning needs .

The suitability between the learning content, teaching strategy, and students' characteristics is important because individual differences can influence the effectiveness of the learning process. Differences in students' cognitive abilities, prior knowledge, learning experiences, and information-processing capacities may either become obstacles to learning or provide opportunities for more effective learning when appropriately accommodated by the teacher (Creswell & Creswell, 2018). Therefore, effective teaching requires teachers to organize learning information systematically and present it in a form that can be processed and retained by learners.

Memory plays an important role in the learning process because new information must be attended to, encoded, stored, and subsequently retrieved when it is needed. Working memory is a limited-capacity system responsible for temporarily maintaining and processing information during complex cognitive activities such as comprehension, reasoning, and learning (Baddeley, 2000). Cowan (2001) further argued that the capacity of short-term memory is more limited than the traditional " 7 ± 2 " formulation proposed by Miller (1956), with evidence suggesting that approximately three to five meaningful chunks can be actively maintained under many conditions. This limitation indicates that presenting excessive information simultaneously may overload learners' working memory and reduce their ability to process and retain essential information. Consequently, teachers need to organize learning materials into manageable and meaningful units so that students can focus their attention on the most relevant information.

The memory compression technique can be understood as a learning strategy that organizes several related pieces of information into a concise and meaningful form, such as a sentence, sequence, keyword, or other structured representation. This approach is conceptually related to mnemonic techniques, which facilitate learning by establishing associations between information that needs to be recalled and information that is easier or more meaningful to retrieve (Sacks-Zimmerman & Lerma, 2018). Mnemonic strategies can be used to support the retention and retrieval of verbal, visual, and kinesthetic information. A systematic review of mnemonic-based learning also reported evidence that mnemonic techniques may provide advantages over conventional memorization approaches in several educational contexts (van de Lint & Bosman, 2019). Therefore, organizing information into concise and meaningful representations may help

learners encode essential elements of a skill and subsequently retrieve them during learning and performance.

In the context of physical education, memory is particularly important because skill learning requires learners not only to remember verbal instructions but also to translate information into coordinated motor actions. Motor learning involves the acquisition and refinement of movement patterns through practice, feedback, cognitive processing, and repeated performance (Schmidt & Lee, 2019). When students learn a new motor skill, they must remember important movement components, understand the sequence of actions, and coordinate these components into an appropriate motor response. Consequently, the organization of instructional information into concise and easily retrievable units may help students focus on the essential elements of a skill while reducing unnecessary cognitive demands.

Volleyball is a fast-paced, open-skill sport that requires players to perceive information, interpret rapidly changing situations, make decisions, and execute appropriate motor responses within a limited period. Research on decision-making in volleyball indicates that athletes must rapidly perceive and interpret environmental information before planning, initiating, and executing a technical action (Panchuk et al., 2019). Perceptual and cognitive processes therefore play an important role in determining the quality and speed of volleyball skill performance. The ability to retrieve previously learned information and apply it to an emerging game situation is particularly important because volleyball players must continuously adapt their movements to the position of the ball, teammates, opponents, and changing game conditions.

The process of extracting relevant information and performing an appropriate technical action may occur within a very short period. Therefore, strengthening students' ability to retain and retrieve essential skill-related information may contribute to more effective volleyball learning. In this context, the application of the memory compression technique is considered relevant because it emphasizes the organization of important learning information into concise representations that can be readily recalled during skill practice. By presenting the essential components of a skill in a structured and compressed form, the teacher may help students focus their attention on the key movement sequences rather than attempting to process excessive amounts of information simultaneously.

The problem encountered by learners and teachers in the learning of basic

volleyball skills is not merely the acquisition of information but also the retention and subsequent retrieval of that information. Forgetting may occur when newly acquired information is insufficiently encoded, poorly organized, or not adequately reinforced through retrieval and practice. From a cognitive perspective, effective learning therefore requires more than simply presenting information; learners need opportunities to process, organize, practice, and retrieve the information repeatedly. Mnemonic and memory-based strategies can support this process by providing meaningful cues that facilitate later retrieval (Sacks-Zimmerman & Lerma, 2018). Thus, the teacher has an important role in selecting, organizing, and presenting information in a manner that corresponds to the learner's cognitive capacity and the characteristics of the skill being taught.

Based on these considerations, the researcher identified the need to investigate the application of the memory compression technique as an instructional strategy for learning basic volleyball skills. The technique is expected to assist students in organizing and retaining essential information related to movement sequences and technical performance. By improving the organization and retrieval of skill-related information, the method may facilitate students' understanding and execution of basic volleyball skills. Therefore, the present study focuses on examining the effect of using the memory compression technique on learning selected basic volleyball skills among students of the College of Physical Education and Sports Sciences at Wasit University.

The study aims to identify the level of basic volleyball skills among students of the College of Physical Education and Sports Sciences at Wasit University; to prepare special exercises based on the memory compression technique for learning selected basic volleyball skills; and to identify the effect of special exercises based on the memory compression technique on learning selected basic volleyball skills among the students. The researcher hypothesized that there would be statistically significant differences between the pre-test and post-test results of the experimental group in the selected basic volleyball skills, with the differences favoring the post-test results.

RESEARCH METHODOLOGY

Solution to problem depends directly on type of methodology used in research and investigation, and the researcher used experimental method because it is suitable for solving current research problem, success of research in its natural form requires a correct and mature selection of research community as well as its sample. Community consisted

of third-year female students. At College of Physical Education and Sports Sciences, University of Wasit, the researcher used a single-group experimental design, sample consisted of (16) female students from section (A), third year, who were selected randomly. The experimental group consisted of only (16) female students. In addition, the researcher conducted pilot study on a sample of (6) female students from same year at College of Physical Education and Sports Sciences, University of Wasit from same division but from outside main research sample, percentage of sample as a whole from its original population was (44.44%) out of (45) female students. The researcher measured age, height and mass to demonstrate homogeneity of sample, as shown in Table (1).

Table 1. Homogeneity of sample

Variable	Measurement units	Mean	Standard deviation	Median	Skewness coefficient ± 3
Age	Year	22.433	1.432	22.6	0.433
Height	cm.	179.32	3.2	179	0.299
Mass	Kg.	68.21	2.032	68	0.754

Results in table above indicate that all anthropometric variables fall under the normal curve, which indicates the good distribution and homogeneity of the sample in the research variables, because one of the characteristics of the typical normal curve is that the skewness coefficient is confined between the two values (+1).

Field Procedures

It is customary to conduct a pilot experiment before implementing the main experiment to identify and avoid potential errors that may occur during the research procedures and to determine the ability of the research team to perform the tasks required to achieve the objectives of the main experiment. A pilot experiment is useful for evaluating the feasibility of research procedures, identifying practical difficulties, estimating the time required for testing, and ensuring that the research team can implement the procedures consistently before the main study is conducted (Creswell & Creswell, 2018). The researcher conducted the pilot experiment in two stages. First, an exploratory experiment involving the skill tests under investigation was conducted on Monday, January 19, 2026, using students from Section (A) who were not included in the main research sample.

The purpose of this experiment was to familiarize the participants with the procedures and requirements of the tests, determine the ability of the assisting research team to control and manage the testing procedures, and identify the time required to administer the tests and the average performance time of the participants. Second, an exploratory experiment involving the exercises used in the educational program was conducted on Thursday, January 22, 2026. This experiment aimed to determine the ability of the research team to apply the selected exercises, assess the participants' understanding of the exercises, determine the time required to perform each exercise, and estimate the appropriate duration of each educational unit. Such preliminary testing is important because it allows researchers to identify procedural problems and improve the implementation of the experimental protocol before collecting the main research data (Hulley et al., 2013).

Pre-Tests

The pre-tests were administered to the experimental research group, which consisted of 16 female students, on February 10, 2026. The skill tests were conducted on the college playground. Before the tests began, the researcher provided the participants with detailed explanations and demonstrations of the test procedures to ensure that all participants understood the requirements and performed the tests under standardized conditions. The use of a pre-test provides baseline measurements that can subsequently be compared with post-test results to determine changes following the intervention. The pretest–posttest approach is widely used in educational and experimental research because it enables researchers to assess changes in participants' performance following an intervention (Dugard & Todman, 1995; Creswell & Creswell, 2018).

Main Experiment

The researcher implemented the main experiment in the form of educational units based on the memory compression method. The experiment was conducted from February 15, 2026, to April 18, 2026, and consisted of eight educational units, with one unit conducted per week. Each educational unit lasted 90 minutes and focused on selected skills. The educational units included 10 exercises for each skill, resulting in a total of 30 varied exercises. The exercises were selected based on a review of relevant scientific sources and consideration of the opinions of experts and specialists in the field. All

educational units were implemented according to the principles of the memory compression method, with the selected exercises incorporated into the main section of each educational unit. The intervention was administered to the experimental group during the second semester of the 2025–2026 academic year at the college playground of the University of Wasit.

The memory compression technique was applied systematically throughout the intervention period from February 15 to April 18, 2026. The educational units were designed to reinforce the learning and retention of the selected skills through the structured application of the prescribed exercises. Each unit lasted 90 minutes, and the exercises based on the memory compression method were implemented during the main part of the educational unit. The researcher maintained consistency in the implementation procedures throughout the eight-week intervention period to ensure that the experimental treatment was delivered uniformly. Maintaining standardized procedures during an intervention is important in experimental research because consistency in treatment delivery helps reduce the influence of extraneous factors and strengthens the interpretation of differences observed between measurements (Creswell & Creswell, 2018).

Post-Tests

After the completion of the eight educational units based on the memory compression method, post-tests were conducted on April 21, 2026. The researcher maintained procedures consistent with those used during the pre-tests, including the same testing procedures, test conditions, and assisting research team. This consistency was maintained to minimize the influence of external factors and ensure that differences between the pre-test and post-test results could be attributed primarily to the educational intervention. In a pretest–posttest design, administering comparable measurements before and after the intervention allows the researcher to identify changes in the dependent variables associated with the treatment (Dugard & Todman, 1995; American Psychological Association, 2018).

Statistical Methods

To process and analyze the data obtained from the research sample, the researcher used the Statistical Package for the Social Sciences (SPSS). The statistical methods

employed included the arithmetic mean, standard deviation, skewness coefficient, percentage calculation, and independent-samples t-test. The arithmetic mean and standard deviation were used to describe the central tendency and variability of the data, while the skewness coefficient was used to examine the distributional characteristics of the scores. Percentages were used to express the relative distribution of the data where appropriate. The independent-samples t-test was used to determine whether statistically significant differences existed between the means of two independent groups. The selection of statistical procedures should be based on the characteristics of the data, research design, and assumptions underlying each statistical test (Field, 2018).

RESULTS AND DISCUSSING

Table 2. Calculated means, standard deviations, difference between means and deviations, and t -value for pre- and post-tests of skills.

Variables	Measurem ent unit	Experimental group pre-test		Experimental group post-test		F- value	H _a	Calculated (t) value	Sig. level	Sig. type
		M.	St.d	M.	St.d					
Serving	Degree	14.1 7	0.864	21.57	1.342	7.429	1.555	17.876	0.000	Sig.
Receiving	Degree	43.6 5	6.640	66.50	6.124	22.857	6.419	13.323	0.000	Sig.
Setting	Degree	11.8 9	1.167	19.36	0.929	7. 500	1.345	20.872	0.000	Sig.

Discussion Of Experimental Group Test Results

After reviewing Table (2), the significant differences in the research results were noted in favor of the post-tests. The researcher attributes these results to the fact that the exercises were implemented and the researcher worked on coordinating the exercises well and took good distribution of the exercises, as the exercises are carried out during the preliminary section of the training unit. This requires high division and coordination to implement exercises and not waste time and be aware of time, as (Hussam Al- Muamun and others) mention “consistency between the exercises and training units through good distribution and division of exercises. (Al-Muamun, 2025). On the other hand, the exercises prepared by the researcher were cooperative in nature, characterized by one of the most important stages of the strategy, which is cooperation, which made the

educational process a participatory and understanding process among the students. Also, the use of the principle of diversification in the applied exercises, and the balance between the duration of the exercise with rest according to the requirements of the skill and the effort exerted, as well as the use of an appropriate number of repetitions, contributed to increasing the amount of learning, as “one of the necessary elements for learning motor skills is reliance on exercise and training and recalling experiences to achieve the appropriate response to the situation.

(Allam, 1986) as Magill (1998) emphasized that “diversifying exercise experiences and organizing them in the duration of the exercise and diversifying the movement will increase the acquisition of educational experience by deriving variable exercise experiences that increase the ability to perform the skill better. (Magill, 1998). The researcher worked on paying attention to the precise planning in the procedures of the units and exercises in those units, as this works to take precautions and pay attention to more details during the work, as Aseel mentions, “Changes in the training mix prove their effectiveness in good planning of exercises and their continued application for (12) weeks. (Aseel, 2021). The teacher's work in the lesson is limited to several points, which are controlling the lesson, guidance, instruction, and follow-up. Since the experimental work is characterized by the pre-selection of the sample and it becomes smaller in number, this gives an advantage to the teaching staff. Here it is worth noting that the memory compression method can be easily applied to large numbers as well, but the intention is that the guidance, advice, and supervision by the teaching staff of the skills gave an advantage to the experimental group. The diligent follow-up with them and special attention made the understanding of the skills crystallize and their learning faster for them, as Balqis and Tawfiq mention. Supervision and guidance by the teacher or by members of the same group has a significant impact on the students' learning process, making it faster and providing guidance, whether from the teacher or from the students. (Balqis, 1982).

CONCLUSIONS

Memory compression technique has an effect on learning some basic volleyball skills, memory compression technique has given female students opportunity to discover their true ability to utilize minimal information to acquire the greatest possible knowledge, memory compression technique has been shown to improve storage of

information in short, medium and long memory, and this has been observed through skill performance after theoretical explanation of them. Adopting memory compression techniques that the researcher used them because they are exercises that are appropriate for ages close to level of sample. Diversifying and introducing new exercises that serve students in learning process and create a leap in student's understanding and speed of learning.. Carefully refining the selection of exercises helps to develop skill performance effectively. Work should be done to take into account previous studies and implement recommendations and suggestions, as some of these recommendations advise completing the work that they started. Conducting research for similar studies and for different samples in a broader and more comprehensive manner.

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Appendix (1)

A model educational unit

Learning Unit 1, Date: 10/2/2026, Week: 1, Level: Third, Time: 90 minutes

Educational Objectives: To accustom students to discipline.

Learning Objectives: To teach skill of serving and receiving.

Educational Unit Departments	Time in minutes	Details of learning unit	Organization	Notes
Preparatory	15 min.			
Section -Introduction and warm-up	7 min.	Standing in a straight line to register attendance and start the lesson with the agreed-		Emphasize the importance of
	8 min.	upon shout (sports activity) followed by general body preparation exercises: walking - jogging with arms rotating forwards and backwards - raising knees high - normal jogging - walking - stopping.		attendance, calmness, and regular performance of general exercises .
Physical exercises		-Giving physical exercises that target the main section of the educational unit and the skill to be learned during this unit.		Taking into account the health and safety of students .
				-
				Emphasize

				performin g the exercises correctly.
Main Section	65 min.	The teacher explains the skills		1-Give an
Educational	15 min.	and works on identifying 5-7		introductio
activity		key pieces of information for	xxxxx xxxxx	n to
		each skill, putting them into a	♠ xxxxx €	today's
		verbal sentence during the	xxxxx	skill And
		explanation and repeating the	xxxxx	link it
		sentence whenever possible		- Making
	45 min.	during the explanation.		students
		Exercises prepared by the		reflect and
		researcher		observe
		The assistant staff supervises		what the
		the exercises; the students		teacher
		send the balls to the other side		provides
		of the court, and the serves are		in terms of
		corrected using a memory		explaining
		compression technique.		the parts
		Each pair of students stands		of the skill
		facing each other in two lines,		(attendanc
Practical		and for each pair of balls, the		e).
activity		students prepare for each other		2- The
		and correct mistakes by		teacher
		recording that for each		presents a
		student.		good
		The students stand in the		example
		shape of two trains facing		of each

		each other vertically. One student aims his work at his colleague with a crushing blow, and the colleague receives the ball from below.		aspect of the skill. -A structured presentation of the information and experiences under study in a sequential manner (news)
The final section	10 min.	Do a light jog around the playing field. A small game. End the lesson with a shout (Sports Activity).	 	Emphasize relaxation exercises and student understanding of the learning unit, then leave quietly.