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Hussein Farhan Sheikh Ali
Directorate of Misan Education,
Ministry of Education of Iraq

Munadhil Adil Kasim
Directorate of Misan Education,
Ministry of Education of Iraq

The effect of using the strategy of educational scientific pillars on the level of performance of volleyball skills among students at the college of physical education and sports sciences

Hussein Farhan Sheikh Ali and Munadhil Adil Kasim

Abstract

The objective of this study was to assess the effectiveness of utilizing the V-shape method in enhancing cognitive achievement and skill performance in certain volleyball skills among students enrolled in the College of Physical Education and Sports Sciences at Misan University. The research utilized an experimental approach. A comprehensive assessment of volleyball skills was conducted, encompassing the areas of Overhand Serve, Underhand Serve, Overhead Passing, and Underhand Passing. The examination was delivered to a representative sample of 12 second-year students enrolled in the College of Physical Education and Sports Sciences at Misan University. The participants were allocated into two distinct groups: An experimental group consisting of ten students who employed the V-shape strategy for studying, and a control group including ten students who followed the standard approach to studying. The results of the study revealed statistically significant differences, at a significant level of 0.05, in the mean scores of the students from the two study groups in relation to their volleyball skills. The experimental group exhibited higher performance compared to the control group. This study suggests the utilization of the V-shape strategy as a pedagogical approach for teaching volleyball. It highlights the significance of providing educators with appropriate training to effectively implement this strategy. Additionally, it emphasizes the integration of the V-shape strategy into curriculum design. Furthermore, the study suggests the need for additional research to assess the effectiveness of this strategy in teaching scientific concepts and exploring variables that were not addressed within the confines of this study.

Keywords: Strategy, educational scientific pillars, performance volleyball skills

Introduction

Education is one of the key strategies for the development of society because educational institutions hold out hope for the future. As a result, educational technology has evolved to fit modern development rather than just taking on a more contemporary look (Rahm, 2023) ^[23]. This assertion is supported by numerous scientific studies that have been conducted with the objective of identifying the most effective instructional approaches (Joshi, Vinay & Bhaskar, 2021) ^[12]. It is important to note that educational advancement does not solely rely on the introduction of new educational materials, programs, or technological devices. Rather, it hinges on the strategic utilization of innovative techniques and the resources generated by educational technology to foster a beneficial influence on learners (Liang, 2022) ^[18]. The primary emphasis of physical education courses and activities lies predominantly on the practical implementation. Educational technologies that incorporate visual and auditory elements, as well as other instruments and equipment, play a significant role in highlighting the unique aspects of movement (Ouyang, 2023) ^[20]. These strategies additionally augment the enjoyable and captivating elements of the pedagogical process, consequently heightening the learner's engagement and enhancing the acquisition of physical education curriculum activities (Bracco, Lodewyk & Morrison, 2019) ^[2]. The educational pillars method refers to an educational system that places emphasis on the active engagement, mobility, and interaction of learners within educational settings (Salhab & Daher, 2023) ^[25].

Corresponding Author:
Hussein Farhan Sheikh Ali
Directorate of Misan Education,
Ministry of Education of Iraq

This strategy customizes educational activities and materials based on the learners' talents, aptitude, and past knowledge, aiming to fulfill their learning needs and boost their enthusiasm for learning (Ginting, 2021) ^[9]. Therefore, through enhancing their practical knowledge and honing their competencies, the notion of educational pillars revolves around furnishing learners with temporary support tailored to their specific needs. This support can manifest in the form of hints or informative guidance, aimed at facilitating their progress (Weber, Patterson & Blank, 2022) ^[31]. There are certain skills and abilities that empower individuals to sustain their learning endeavors. Subsequently, they are tasked with autonomously completing the remaining aspects of their education, relying solely on their own capabilities to further their knowledge acquisition (Matsiola, Spiliopoulos & Tsigilis, 2022) ^[19]. In their recent study, Chow, Komar, and Seifert (2021) ^[4] highlight the significance of the pedagogical pillars approach, which prioritizes the provision of temporary support to learners through a range of activities and programs. Subsequently, learners are encouraged to independently complete the remaining portion of their learning, drawing upon their own abilities and prior knowledge. Sohrabi *et al.* (2023) ^[27] assert that the educational pillars strategy is an application of the social constructivist theory developed by Vygotsky, a Russian-born psychologist. This theory highlights the importance of cooperative learning, where learners construct knowledge through their own efforts and with the guidance of more experienced individuals. Learning and knowledge acquisition are facilitated through communication and social interaction. The Pillars of Education strategy aims to enhance the learner's capacity to build meaningful connections between their prior knowledge and the present educational environment (Perkins & Hahn, 2020) ^[21]. Additionally, the objective of this endeavor is to provide the student with the necessary abilities to proficiently assess concepts, utilize accessible resources to address and navigate diverse circumstances, and finally attain novel results that enhance their comprehensive learning encounter (Claudino *et al.*, 2019) ^[5]. Furthermore, this methodology places significant emphasis on fostering autonomy and self-reliance throughout every phase of the educational journey (Voznyak, Stasyshyn, & Koval, 2022) ^[29]. Based on the research conducted by Farias, Wallhead, and Mesquita (2020) ^[7], the pedagogical pillars technique is distinguished by its collaborative nature, wherein students engage in problem-solving activities with the guidance of a teacher or through mutual aid from their peers within an educational setting. Various instructional strategies are employed in the field of education, including division, audiovisual media, feedback, the utilization of questions and recommendations, and audiovisual media (Chan, Bogdanovic & Kalivarapu, 2022) ^[3]. The acquisition and proficiency of fundamental volleyball skills, encompassing a range of kinetic terminology and associated responsibilities, are integral to the adherence and execution of the game's regulations. Proficiency in diverse manifestations of these foundational skills constitutes a significant determinant of achievement and distinction in the sport of volleyball (Kirby & Kluge, 2021) ^[16]. According to Hoerr (2019) ^[10], it is crucial to consider the broadening of the foundation of fundamental skills and the progression from simple to complex movements when instructing basic skills and enhancing skill proficiency. Additionally, attention should be given to the cognitive aspect, which involves defining and comprehending concepts, acquiring knowledge of game rules, and emphasizing the evaluation process to

minimize time and effort. According to Ronkainen *et al.* (2021) ^[24], it is important to consider the expansion of the foundational skills base and the progression from simple to complex movements when teaching basic skills and improving skill performance. Additionally, attention should be given to the cognitive aspect, which involves defining and understanding the skills, acquiring knowledge of the game rules, and focusing on the evaluation process to minimize time and effort (Price, Collins & Stoszowski, 2023) ^[22]. The researchers highlighted that contemporary educational practices in volleyball necessitate the incorporation of technological approaches and methods that involve delivering a series of standardized instructional sessions for skill development, followed by hands-on training sessions within the sports arena (Stone *et al.*, 2021) ^[28]. These sessions should be accompanied by interactive discussions and the provision of instructional materials by the teacher to assess educational progress (Finlay, Tinnion & Simpson, 2022) ^[8]. These materials should be accessible through various educational mediums such as films, slides, film tapes, audio and video recordings, and the Internet, with a focus on enhancing cognitive understanding (Bagila *et al.*, 2019) ^[1]. The concept of research has been defined via the scientific and practical experiences of researchers and their teaching of a volleyball course for students in the Faculty of Physical Education and Sports Sciences, leading to the development of skills and psychological and emotional growth. The researchers observed that educators face several challenges that are evident in the educational strategy employed during the teaching process. This strategy follows a traditional approach to learning, wherein the teacher imparts knowledge and demonstrates the practical application of skills to be acquired. Additionally, the teacher corrects any technical errors made by a limited number of students, without considering the individual differences among them. Although the traditional method has proven effective in specific circumstances and under certain conditions, advancements in scientific knowledge and the growing demands of education have necessitated a reevaluation of this approach. Insufficient student enrollment, inadequate teaching methodologies, and outdated curricula have contributed to suboptimal performance levels in volleyball skill acquisition. The researchers observed that there was a lack of investigation into the efficacy of educational pillars as a method for volleyball education, based on their review of the current literature. Consequently, they conducted a study to assess the impact of this strategy on volleyball performance among students enrolled in the College of Physical Education and Sports Sciences.

Research Objective

The research aims to identify

The effect of using the strategy of educational scientific pillars on the level of performance of some volleyball skills among the students of the Faculty of Physical Education and Sports Sciences.

Research hypotheses

1. There are statistically significant differences between the pre- and post-test of the experimental group in the level of skill performance of the variables under research in favor of the post-test.
2. There are statistically significant differences between the averages of the pre- and post-tests of the control group in the level of skill performance of the variables under

research in favor of the post-test.

- There are statistically significant differences between the two-post-tests of the experimental and control groups in the level of skill performance of the variables under research in favor of the experimental group.

Methodology

Research Methodology

The researchers employed the experimental approach, utilizing a design consisting of two groups: An experimental group and a control group. This choice was made due to its suitability for the nature of the research at hand.

Research population and sample

The research sample was intentionally selected from the second stage students of the Faculty of Physical Education

and Sports Sciences during the first semester of the academic year 2021/2022. The sample consisted of 50 students, with 25 students selected as a representative sample from the original population, accounting for 50% of the total. Additionally, 12 students were excluded from the main study to conduct an exploratory investigation to determine the scientific coefficients (honesty - stability) for the tests being studied. Consequently, the final research sample consisted of 24 students, who were divided into two groups an experimental group and a control group, each consisting of 12 students.

Homogeneity of sample members

To ensure moderation in the research sample, the researchers determined the homogeneity of the variables under study using torsion coefficients, as shown in Table 1.

Table 1: Shows homogeneity of sample members and torsion coefficient of the control and experimental group

Variables		Unit of Measurement	Control		Experimental		T
			M	SD	M	SD	
Variables Growth	Age	Year	19.17	0.25	19.46	0.56	0.29
	Height	Cm	173.45	5.09	170.92	5.11	2.53
	Weight	Kg	69.87	4.90	70.85	5.27	0.98
Basic Skills Volleyball	Overhand Serve	Degree	14.89	5.11	15.22	4.28	0.33
	Underhand Serve	Degree	15.92	5.43	16.06	5.75	0.14
	Overhead Passing	Number	16.77	2.99	16.33	3.05	0.44
	Underhand Passing	Number	17.31	2.56	17.88	2.44	0.57

The analysis of Table 1 reveals that the torsion coefficients for all variables fall within the range of 0.29 to 2.53. This range, denoted as (3), suggests that the distribution of these variables in the study is characterized by moderation.

Equivalence of the two research groups

Equivalence was seen between the two experimental research groups in terms of controlling the variables under investigation, wherein the moderation of the distribution of the research sample members was estimated.

Means and tools of data collection

- Data collection tools.
- Medical scale calibrated to measure weight in kilograms.
- Rustameter device to measure body height in centimeters.
- Tape measure Colored duct tape, stopwatch.
- Computers and CD display.
- Volleyball and volleyball court.

Means of data collection

First: Measuring Growth Rates.

These include (Height- Age – Weight).

Second: Physical Tests

To identify skills variables as well as determine the tests that measure these variables, the researchers designed a questionnaire to survey the opinions of experts on determining the most important skill requirements and how to measure them. The form was presented through personal interviews with experts, and the researchers were satisfied with the opinions of eighty percent of the experts to determine technical skills and how to measure them.

Third: Skill Tests

- Test the Overhand Serve.
- Test Underhand Serve.
- Test Overhead Passing.

- Test Underhand Passing.

Exploratory study

To determine scientific coefficients (honesty, stability) for skill tests, the researchers conducted the first exploratory experiment on (12) students from the same research community and from outside the fundamental research sample between 16 October 2022 and 23 October 2023, to learn about the following.

- The appropriateness of the employed assessments for the members of the research sample.
- Conducting scientific transactions (honesty - consistency) for the research-involved evaluations.

Scientific Transactions (Honesty - Stability) for testing utilized

First: Honesty Coefficient

The researchers employed a method of distinguishing between two groups, one consisting of 12 highly accomplished college students and the other consisting of 12 highly accomplished students from the research community who were not part of the primary research sample. The researchers then calculated the significance of the differences in the research variables between these two groups.

Second: Stability Coefficient

In order to assess the stability coefficient of the variables under investigation, the researchers employed a method involving the administration of a test to the participants of the exploratory research sample. The test was initially administered on a specific date, 16/10/2022, and subsequently re-administered to the same participants after a time interval of seven days, until 23/10/2022. The researchers then computed the simple correlation coefficient between the correlation coefficients obtained from the first and second applications of the survey sample, specifically focusing on the skill variables being studied. The results obtained from both

the first and second applications were analyzed.

Table 2: Shows the correlation coefficient and self-truthfulness of all tests that enjoyed a high degree of truthfulness

No	Tests	Honesty Coefficient	Stability Coefficient
1.	Overhand Serve	90%	92%
2.	Underhand Serve	88%	90%
3.	Overhead Passing	89%	90%
4.	Underhand Passing	90%	93%

Educational program using educational pillars

The educational pillars are

1. Setting educational objectives.
2. Determining ways to achieve objectives.
3. Analysis of the skill of peaceful dialogue and correction.
4. Designing the educational program using educational pillars in its initial form, initial experimentation of the educational program using educational pillars.

First: Setting Goals

The objectives of the educational program have been delineated by the researchers, utilizing the educational pillars, to encompass the instruction of the fundamental techniques of serve and passing in the game of volleyball. This program is specifically designed for students enrolled in the Faculty of Physical Education and Sports Sciences.

Second: Analysis of the skill of transmitting from the bottom of the confrontation overhand serve, underhand serve, overhead passing, and underhand passing

The researchers conducted an analysis on the proficiency of executing the overhand serve, underhand serve, overhead passing, and underhand passing. The purpose of this analysis was to determine the specific components of each skill, including technical and educational steps, knowledge requirements, and graded exercises. The objective was to effectively structure the educational units by organizing the content in a manner that facilitates efficient teaching of the skill within a minimal timeframe.

Third: Determining ways to achieve goals

The methods for attaining the goals of the educational unit have been established through the implementation of educational foundations, such as hypermedia, which involves the presentation of sequential stages starting from the initial transmission phase and progressing towards the final confrontation phase. The process of navigating through educational video footage, still images, and employing cooperative learning techniques, feedback mechanisms, and questioning strategies is crucial in facilitating skill acquisition. However, the presence of a teacher during the learning process serves as a fundamental pillar in enhancing students' motivation for education. Additionally, the utilization of instant reinforcement further contributes to the overall effectiveness of the educational experience.

Fourth: Designing the educational program using the educational pillars in its initial form

The educational program was developed by the researchers based on the foundational principles of education. The program's implementation spans a duration of six weeks, with two sessions conducted each week. Each lesson has a duration of 90 minutes. The lesson incorporates an instructional framework and one of the subsequent instructional frameworks - educational software with hypermedia, educational units employing cooperative learning, or model-

based instruction with verbal explanation and error correction by the teacher. During the lesson, the teacher provided a broad overview of the lesson through engaging questions and facilitated student reflection on the lesson's components. Additionally, the teacher shared some lesson ideas with the students and posed questions, allowing them to formulate their own responses. The study involved collaborative work among students in groups, with a shift of educational responsibilities from the teacher to the student. The support previously provided by the teacher was discontinued, and instead, the student's performance was reviewed until mastery of learning was achieved. Following the transfer of responsibility to the student, there was an increase in the level of student independence, allowing them to learn autonomously without interference from the teacher. Additionally, after acquiring the necessary skills, students engage in competitive activities to foster motivation. The researchers presented the educational program's content, utilizing educational principles, to a group of professors specializing in teaching methods and volleyball in faculties of education, physical education, and sports sciences. The purpose of this presentation was to obtain feedback on the program's validity and ensure its effectiveness.

Fifth: The initial experience of the educational program using the educational pillars

The researchers carried out a supplementary exploratory study with a subset of 12 students who were not part of the primary research sample and were from a different research community. This investigation took place from October 14th, 2022, to October 18th, 2022. The objective of this study was to execute a unit of the educational program by utilizing educational principles.

Pre-Tests

Pre-tests were administered to the participants belonging to both the experimental and control groups on October 20, 2022, in order to measure the variables being investigated.

Main experience

The educational program was implemented on the experimental group over a duration of six weeks. The program consisted of two educational units per week, with each unit lasting 90 minutes. The instructional materials included computer presentations, illustrative pictures, and practical demonstrations by the teacher, each lasting 15 minutes. Additionally, there was a 15-minute period for physical preparation and readiness, followed by a 55-minute period for the educational and applied activities based on the research's educational pillars. Finally, a 5-minute period was allocated for the concluding part. In contrast, the control group received instruction using the conventional teaching method during the period from October 24, 2022, to December 1, 2022.

Post-Tests

The post-tests of the two experimental study groups, namely the control group, were undertaken on two separate dates: December 6th, 2022, and May 5th, 2022. These measurements were taken for the variables under investigation, following the same order and circumstances as the pre-tests.

Statistical Treatments: After completing the application, the researchers collected the data precisely, tabulated it, and processed it statistically using the SPSS program.

Results

Presentation and Discussion of results

First: Presentation of results

Table 3: Shows the significance of the differences between the averages of the pre- and post-tests of the experimental group

Variables		Unit of Measurement	Per-Test		Post-Test		T
			M	SD	M	SD	
Basic Skills Volleyball	Overhand Serve	Degree	15.22	4.28	35.55	4.55	17.75
	Underhand Serve	Degree	16.06	5.75	37.81	5.34	16.91
	Overhead Passing	Number	16.33	3.05	29.61	4.91	13.83
	Underhand Passing	Number	17.88	2.44	30.22	5.77	15.66

Based on the findings shown in Table 3, it is evident that there exist statistically significant disparities between the pre-

and post-tests of the experimental group, specifically in relation to the variables being investigated.

Table 4: Shows the significance of the differences between the averages of the pre-and post-tests of the control group

Variables		Unit of Measurement	Per-Test		Post-Test		T
			M	SD	M	SD	
Basic Skills Volleyball	Overhand Serve	Degree	14.89	5.11	23.62	3.49	14.31
	Underhand Serve	Degree	15.92	5.43	25.08	4.88	12.66
	Overhead Passing	Number	16.77	2.99	22.64	5.11	11.15
	Underhand Passing	Number	17.31	2.56	24.82	5.76	12.07

Table 3 demonstrates that there are statistically significant differences between the pre- and post-tests of the control

group in terms of the investigated variables.

Table 5: Shows the significance of the differences between the averages of the post-tests of the experimental and control groups under study

Variables		Unit of Measurement	Experimental		Control		T
			M	SD	M	SD	
Basic Skills Volleyball	Overhand Serve	Degree	35.55	4.55	23.62	3.49	11.44
	Underhand Serve	Degree	37.81	5.34	25.08	4.88	10.57
	Overhead Passing	Number	29.61	4.91	22.64	5.11	9.29
	Underhand Passing	Number	30.22	5.77	24.82	5.76	13.04

Table 5 presents evidence of statistically significant disparities between the experimental and control groups in the valid post-test scores within the experimental group.

Second: Discussion of the Results

According to Table 3's findings, there were statistically significant changes at the 0.05 level between the experimental group's pre- and post-measurements of the variables being studied, favoring the post-measurement. Researchers credit the success of the following educational pillars: Cooperative learning modules and hypermedia instructional software for the improvement in the study variables in the experimental group. The enhancement of students' ability to efficiently retrieve studied information is facilitated by the teacher's utilization of various instructional strategies, including modeling, verbal explanation, and error correction. Through the provision of gradual assistance during the learning process, either by the teacher or peers, students are able to engage in continuous interaction within the educational context. This interaction serves to facilitate the acquisition, organization, and retrieval of knowledge, thereby enhancing the effectiveness of the learning process. Additionally, the utilization of educational pillars in teaching helps to address challenges such as large class sizes and individual differences among students. Consequently, these instructional approaches have contributed to the development of fundamental skills such as the overhand serve, underhand serve, overhead passing, and underhand passing. This discovery aligns with the observation made by Krishan and Al-rsa'i (2023) [17] that the educational pillars' strategy involves diversifying teaching methods in educational units to cater to learners' needs, levels,

preparations, and preferences. This necessitates teachers to simplify and adapt content, vary teaching methods, and incorporate diverse learning activities to address the diverse requirements of individual learners and groups. By doing so, teachers can maximize learning opportunities for each student in the classroom, leading to favorable learning outcomes, the development of the learner's personality, and the fulfillment of educational objectives. The educational pillars are founded upon the provision of temporary assistance to learners. This assistance may take the form of hints or indicative information, with the aim of equipping them with the necessary skills and abilities to sustain their learning. Subsequently, learners are expected to independently pursue further learning, relying on their own abilities to explore new concepts and acquire knowledge (Wang *et al.*, 2019) [30]. Thus, the validity of the first hypothesis of the research is achieved.

Discussing the results of the second hypothesis

The findings from Table 4 indicate that there were statistically significant differences, at a significant level of 0.05, between the pre- and post-measurements of the control group in the variables being investigated. The observed enhancements in the variables within the control group are ascribed to the beneficial influence exerted by the instructor employing a directive instructional approach. This approach entails the professor verbally elucidating the skill, providing a precise description thereof, demonstrating a practical model of the skill, and offering feedback and ongoing evaluation throughout the instructional period. Consequently, these instructional strategies collectively contributed to the

amelioration of the targeted skills in the study. This finding aligns with the research conducted by Sgrô *et al.* (2020) ^[26], which highlights that the utilization of conventional approaches to acquire motor skills yields favorable outcomes in terms of both motor and cognitive proficiency. This can be attributed to the active involvement of the instructor, who facilitates lesson organization, content delivery, assessment of learning outcomes, and offers learners diverse guidance and instructions to rectify technical errors. Thus, the validity of the second hypothesis of the research is achieved.

Discussion of the results of the third hypothesis

The findings from Table 5 revealed statistically significant differences ($p < 0.05$) between the two-dimensional tests of the experimental and control groups in the variables being investigated, with the experimental group demonstrating more favorable outcomes. The findings shown in Table 5 indicate that the participants in the experimental group demonstrated more progress in the dimensional assessment of the variables under investigation compared to the participants in the control group. The researchers ascribe the superior performance of the experimental group compared to the control group in dimensional measurement to the efficacy of employing educational pillars. The utilization of educational pillars enables teachers to promptly provide feedback to students, thereby facilitating immediate correction of their learning trajectory. Moreover, the implementation of educational pillars introduces an element of suspense and autonomy for students, reducing monotony and routine. These factors collectively contributed to the experimental group students' outperformance in the variables examined, relative to their counterparts in the control group. This finding aligns with the observations made by Falecki and Mann (2021) ^[6] regarding the efficacy of incorporating educational pillars in pedagogy. These pillars facilitate the acceleration of learning and the acquisition of knowledge by offering learners the necessary support. This support is manifested through the utilization of educational technology tools and contemporary teaching approaches, such as cooperative learning, which aid learners in completing assigned tasks. Subsequently, learners are encouraged to independently engage with the material and rely on their own capabilities for learning. According to Jawad, Raheem and Majeed (2021) ^[11], the utilization of educational pillars has been found to be more effective in comparison to the conventional approach for acquiring knowledge and proficiency in both theoretical and practical subjects. Therefore, the third hypothesis of the investigation has been validated.

Conclusions

1. The use of the educational pillars strategy (educational software with hypermedia - educational units in the cooperative learning style - the teacher has a statistically significant positive impact at the level of (0.05) on the level of skill performance in volleyball.
2. Increasing the effectiveness of the educational pillars strategy on the method of learning by commands in improving the level of skill performance in volleyball .
3. The rates of improvement of the telemetry from the tribal in the experimental group (educational pillars better than the control group (traditional learning) increased in the level of skill performance in volleyball.

Recommendations

1. Attention to the use of the strategy of educational pillars

because of its effectiveness in improving the level of skill performance volleyball for students at the Faculty of Physical Education and Sports Sciences, Masin University.

2. Training faculty members and their assistants on the use of the educational pillars strategy in teaching volleyball skills to students of the faculties of physical education and sports sciences.
3. Introducing the strategy of educational pillars within the vocabulary of the teaching methods course in the faculties of physical education and sports sciences with a statement of its advantages and steps for implementation.

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