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The Effect of Using the Reciprocal Teaching and Training Methods on Some Elements of Physical Fitness Among Female Physical Education Students at Palestine Technical University

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ABSTRACT

The current study aimed to identify the effect of using the reciprocal and training methods of teaching on some elements of physical fitness among female physical education students at Palestine Technical University. In order to achieve the objectives of the study, three physical tests were applied. The study used the experimental approach to measure the level of some Elements of physical fitness (speed, muscular strength, and flexibility) according to the teaching method used. The study sample consisted of all (40) fourth-year female students in the Department of Physical Education at Kadoorie University in the first semester of the academic year 2021/2022. The results of the study showed that the students who studied by the reciprocal method obtained the lowest arithmetic mean (5.77 seconds) in the dimensional measurements of speed. This indicates that it is the most effective method in improving the runner's speed, followed by the students who studied the training method with an arithmetic mean of (6.14). As well as the same arrangement in the post-measurement of flexibility, where the average flexibility of the students who studied by the reciprocal method was (38.20). In light of theses results, a set of recommendations were put forward, the most prominent

of which is that teaching methods in physical education have the highest probability of positively affecting a large number of female students. It is necessary to diversify the use of teaching methods in Physical education classes due to the specificity of each teaching method in the development of physical activity.

Keywords: reciprocal teaching method, training teaching method, physical fitness elements, Palestine Technical University

INTRODUCTION

The process of education is a great art that can only be appreciated by those who are academically, professionally, and culturally qualified. Undoubtedly, the progress made in the field of education has had a significant impact on the development of educational work and, consequently, the development of teachers and their profession (Cuellar-Moreno, 2016). This profession is not limited to merely imparting information but has shifted towards the goal of achieving a well-rounded, productive, and capable human personality capable of work and critical thinking. Throughout history, all nations and peoples have been concerned with teaching their members the principles of various sciences, realizing that there is no path to progress and prosperity except through knowledge. They focused on the teacher at times and on scientific material at other times. There was also a great interest in educational methods, tools, and approaches at that time (Tendinha *et al*., 2021). Physical education and sports, like other subjects, work to develop and crystallize an individual's personality in terms of physical, psychological, and social aspects, relying on the distinctive motor activity (Parlebas, 1999; Dugas, 2010). It is considered an effective means to achieve the goals of modern education, which include creating a state of mental and emotional balance, stability in social relationships and society, and changing individual behavior and attitudes towards flexible thinking, accepting others, as well as developing mental and intellectual functions (Koh et al., 2017). Since physical education and sports are among the most important elements in the national educational system, physical education teachers need to review their teaching methods in order to have a meaningful impact on learners. The success of a teacher is not limited to students achieving the objectives of the subject matter, but also extends to the quality of what they instill in their students, their behaviors, values, principles, and attitudes (Lanos*et al*., 2021). Therefore, it has become necessary for physical education teachers to revisit their teaching methods in order to have an effective influence on learners.

That is because the teaching methods used in these contexts are essential and serve as a starting point for guiding teachers towards effective and impactful teaching practices that influence student behavior. These methods are based on various theories, models, patterns, and experiments conducted by experts in the field of educational psychology and teaching, particularly in the field of physical education. As a result, a variety of teaching methods have emerged in the field of physical education, emphasizing the need to shift the focus of teaching in educational institutions to the learner and to abandon the authoritarian teaching approach. Instead, several creative and interactive approaches and methods should be followed, focusing on the interaction between learners (Wallhead *et al*., 2013). Understanding this range of teaching methods and their dimensions has become a fundamental requirement for the teaching process in the field of physical education and sports across various educational institutions. This is because it is one of the influential factors in teaching, allowing teachers to be more flexible, impactful, and in control of the teaching process. It is considered one of the

key features of an effective and outstanding teacher, as successful teaching only occurs when there is a clear application of teaching methods that align with the intended goals, and this cannot be achieved without understanding the teaching methodologies (Koon *et al*., 2017).
Based on the above, the researchers identified the problem of the study, which can be summarized in answering the following questions:

1. What is the impact of using the interactive and training teaching methods on the level of some physical fitness elements (muscular strength, speed, flexibility) among female physical education students at Palestine Technical University-Khudouri?
2. What are the differences in using some teaching methods on the level of some physical fitness elements among female physical education students at Palestine Technical University-Khudouri?

The Importance of the Study

The significance of this study stems from the importance of its subject matter, which aims to explore the importance of using certain teaching methods and their impact on the development of specific physical fitness elements. This is achieved through the application of tests on physical fitness elements using the interactive and training teaching methods. The researchers hope that this study will provide results that assist educators in selecting the best methods that contribute to the development of physical attributes in students. Physical education is not limited to cognitive aspects alone, but extends to physical and motor skills in students. It has been observed that traditional teaching methods used in this subject are unable to achieve these objectives without employing diverse teaching methods in the educational process. The study's importance lies specifically in the scarcity of research addressing the impact of teaching methods on physical fitness elements. It is considered one of the pioneering studies in Palestine in this field, which can aid teachers in selecting and using the most effective methods for developing physical fitness elements in students. Additionally, through the researchers' work in the field of teaching in the Department of Physical Education, it has been noted that the most commonly used method by teachers in educational institutions is the traditional authoritative method, without resorting to the use of other teaching methods. Therefore, the study's theoretical framework and its findings are expected to benefit researchers in the sports field to conduct similar studies on different teaching methods and physical fitness elements for both genders.

Study Objectives

The study aims to examine the impact of using the interactive and training teaching methods on the level of some physical fitness elements among female physical education students at Palestine Technical University-Khudouri. Additionally, it aims to identify the differences in using certain teaching methods on the level of some physical fitness elements among female physical education students at Palestine Technical University-Khudouri, based on the variable of teaching method type.

THE THEORETICAL FRAMEWORK AND PREVIOUS STUDIES

The Theoretical Framework

Teaching Methods in Physical Education and Sports:

Teaching methods are considered essential components of the curriculum because educational objectives and the content selected by curriculum specialists cannot be evaluated except

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through the teacher and the methods they employ in teaching. Therefore, teaching can be considered as the link between the learner and the components of the curriculum.

Mosston (1966) was the first pioneer to extensively discuss a series of teaching methods in physical education and sports, and it was first used in the United States.

Mosston and Ashworth (1970) agree that the field of physical education and sports has provided a classification for the sequence of teaching methods, which includes ten main methods. These methods aim to provide diverse teaching approaches that align with the needs and requirements of students in learning physical and sports skills. Some of the mentioned methods in the theoretical framework of the study are:

1. Command Style: In this style, students are directly and explicitly instructed by the teacher.
2. Reciprocal Style: It involves interactive exchange between the teacher and students in the development of physical skills.
3. Discovery Style: It encourages students to independently discover and experience physical skills.
4. Guided Discovery Style: It involves the teacher guiding students through a process of discovery and exploration.
5. Problem-Solving Style: It focuses on engaging students in problem-solving situations related to physical skills.
6. Inclusion Style: It emphasizes the inclusion and participation of all students in physical activities, regardless of their abilities.
7. Practice Style: It involves repetitive practice of physical skills to enhance proficiency.
8. Self-Check Style: It encourages students to self-assess and monitor their own progress in learning physical skills.
9. Guided Cooperation Style: It emphasizes cooperative learning and collaboration among students in practicing physical skills.
10. Individual Program Style: Its tailors' instruction to meet the individual needs and abilities of students in physical education

These teaching methods provide educators with a range of options to create effective and engaging learning experiences in the field of physical education and sports. By employing various teaching methods, teachers can cater to the diverse learning needs and enhance the development of physical skills in students.

Previous Studies

Several previous studies have investigated the impact of teaching methods on physical fitness elements among students. These studies have examined the effectiveness of different teaching methods, such as the command style, reciprocal style, and discovery style, in developing specific physical fitness components such as muscular strength, speed, and flexibility. However, there is a need for further research in this area, particularly in the context of female physical education students at Palestine Technical University-Khudouri.

The study aims to contribute to the existing body of knowledge by exploring the impact of the reciprocal and training teaching methods on the level of physical fitness elements among

female physical education students. It also aims to identify any differences in using teaching methods on physical fitness elements based on the variable of teaching method type.

Regarding the application method guided by the teacher (training style), the teacher explains the task and provides opportunities for students to practice and develop skills at their own pace. When students perform the specified tasks, the teacher generalizes the class to provide individual and group feedback. For example, the teacher demonstrates how to perform a basketball jump. While students practice their shooting style, the teacher moves around the class to provide feedback. The training method allows for the transfer of decision-making from the teacher to the students, leading to the creation of a new reality. It provides new conditions and achieves a range of objectives. Some of these objectives are related to skill development, while others are related to expanding the individual's role in the method. This method is used after the command style, specifically when the skill learning process is completed, aiming to improve and perfect the technical performance of the skill. In this method, the teacher's role is to make all planning and evaluation decisions without giving any direct orders to the students, allowing them to learn how to make execution decisions (Syrmpas & Digelidis, 2014).

The training method works by transferring some of the decision-making from the teacher to the students, resulting in new situations and relationships between the students themselves, or between the students and the tasks performed, or between the teacher and the students themselves. This method initially involves individual work in implementing the decisions. The training method allows students to be independent in their practices during the lesson, especially in the application and practice of motor skills, thus providing opportunities for self-reliance and attempting to acquire the technical performance and mastery of the skill (Morgan *et al*., 2015). This is evident in the following nine decisions:

1. Body positions: Students take body positions to execute the required tasks, while the teacher moves among them and observes their free performance, providing feedback.
2. Space occupied by students during application.
3. Work system.
4. Starting time for the work, as determined by the students.
5. Rhythm.
6. Completion and stopping of work.
7. Rest and intervals between activities.
8. Clothing and appearance.
9. Asking clarifying questions.

This style distinguishes itself from other Mustang methods in that it provides sufficient time for application, enhances the learner's level of performance and proficiency, and allows the learner more freedom in performance through the decisions transferred to them from the teacher. Therefore, the learner exercises independence in making decisions related to the timing of the start and end, duration of performance and application, rhythmicity, and in a manner that aligns with the nature of the performance.

The Reciprocal Style (Peer Direction):

This style works towards creating new relationships on the field between the teacher and the learner, where the learner takes more decisions, specifically related to assessment to provide direct feedback. This style requires organizing the class into pairs, with each learner assigned

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a role, where one performs and the other observes, in order to provide feedback to the performer and observer and deal only with observation (Hodges Kulinna & Cothran, 2013).

The reciprocal style is a method that allows both the teacher and the student to make more decisions compared to the traditional authoritative style, primarily focusing on assessment to provide direct feedback. This style requires organizing students into pairs to work collaboratively, with one performing the required skill and the other observing and making assessment decisions based on observation and providing feedback to the performer.

In this style, the student takes more decisions, while the role of the teacher is limited to explaining the skills to be learned and providing a model, then asking the students if they have any confusion or need clarification on any point to repeat the explanation and clarification. Once assured that the instructions and explanations have been understood by the learners, the teacher provides them with a special form called the "assignment form," which includes all the information and tasks that the learner will perform and how to do them during the lesson. The teacher then divides the students into pairs, with one student as the performer and the other as the observer, where the observer's role is to provide explanations and correct mistakes based on the information previously prepared and explained by the teacher in the assignment form or the instructional section of the lesson. In other words, each group is divided into mutually observing pairs, forming two rows. The members of the first group take turns observing the performance of their peers in the second group, while the members of the second group observe their peers in the first group (Flavier *et al*., 2017).

As a single teacher cannot observe and evaluate the immediate performance of the entire class, even through simple movements, this evaluative role can be delegated to the student. The educational role here is to assign the peer the responsibility of observing the performance as a specific unit of work and provide the student with information about the correctness and errors in their technical performance. If students learn what they should observe and how to correct errors, they can perform the role of observer and corrector with great enthusiasm and success. This decision-making process is the beginning of individualization, where the student makes decisions on their own, and it encourages both the teacher and the student to engage in behaviors different from previous ones. The teacher learns not to give orders for every movement, skill, or specific activity, while the student has the opportunity to learn how to make decisions within the framework set by the teacher (Spittle *et al*., 2015).

For the success of this style, the teacher should prepare a card in advance that includes a specific description of the skill to be learned, observation points, and necessary feedback, as well as illustrative diagrams and sequential images of the skill. This card is given to the observing student so that they can provide accurate information about the performer's performance. The interaction, trust, and confidence that occur between the two parties (observer and performer) as peers, at the same age and educational level, make them feel that they are playing the role of the teacher, which gives them a sense of responsibility and enthusiasm (Maddeh *et al*., 2015).

Physical Fitness:

Engaging in regular physical activity is essential for improving low levels of physical fitness in many countries due to the health benefits it provides for cardiovascular health and blood

vessels. Without physical activity and with decreased physical fitness, there is a higher risk of developing diseases, including decreased cardiorespiratory fitness and cardiovascular problems (Susana *et al*., 2018, p. 2).

The term "physical fitness" is widely used in our present era, especially in sports and health circles, due to its direct association with human health and well-being. The emergence of modern diseases resulting from inactivity and lack of movement has led to a focus on physical activity and physical fitness. In ordinary terms, physical fitness, for many people, refers to the physical readiness to perform daily life activities due to the soundness and vitality of the different body systems. Physical fitness has been studied extensively by scientists and experts in physical education and movement science, resulting in various definitions and classifications (Lee & Joo, 2020).

According to Hermassi *et al*. (2021), physical fitness is defined as the level of physical condition that an athlete relies on in the components of physical fitness specific to their sport, which is measured through scientific measurement devices and tests and compared to the optimal level. Physical fitness is a measure of the body's ability to work efficiently and effectively.

The American Medical Society and the American Heart Association have classified physical fitness based on two principles: health-related fitness components (body composition, cardiorespiratory fitness, muscular strength, muscular endurance, and flexibility) and skill-related fitness components (in addition to the health-related components, speed, agility, balance, coordination, and accuracy) (Hermassi *et al*., 2021).

In this study, the researcher will discuss the importance of these characteristics as part of physical fitness, as follows:

Speed:

Speed is one of the fundamental components of physical performance in most individual and team activities. It is considered one of the physical attributes that play a significant role in the needs of physical education students. The speed of physical education students is evident in their ability to start and run quickly over short distances. This is because the playing conditions are variable and consecutive during the performance of similar or dissimilar movements in a successive and successful manner in the shortest possible time. Thus, speed is regarded as an indicator of the extent to which muscular responses are in line with the neural responses necessary for timing and the specific motor range of different sports skills. This requires the efficiency of both the muscular and neural systems. Therefore, speed can be defined as "the ability to perform a movement or repeated movements in the shortest possible time" (Syrmpas *et al*., 2014).

Matveev (1998) perceives speed as "a set of functional characteristics that directly and indirectly determine the speed of movement performance and reaction time. It means an individual's ability to perform certain movements in the shortest possible time.

The optimal age for developing individual motor speed (running) is considered to be around 9-10 years old. It is also noted that repeated movements decrease around the age of 14-15, which is the age when an advancement in the speed of performing these movements is observed. The developmental stages between 11-19 years old and 13-15 years old are considered the best

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stages for discovering speed talent. Furthermore, it is mentioned that practitioners working with individuals aged 14-16 years old face difficulties in developing speed due to the lack of coordination between the contracting and stretching muscles that should contract together (Stoddart&Selanders, 2022). However, it is possible to significantly develop speed for players between the ages of 10-14, and for physical education students aged 23-24 and above, the goal of speed training is to maintain the speed level.

Muscular Strength:

Muscular strength is the ability of muscles to generate force against resistance. It is essential for all sports that require physical activity. Muscular strength can be classified into maximal strength, speed-strength, and endurance strength. Physical education students who possess muscular strength play a significant role in the elements of physical fitness because they primarily rely on strength (Casey &Macphail, 2018; Haerenset al., 2014).

Handgrip strength is also crucial because all passing and shooting actions require strength, especially when it comes to the wrist and fingers, which leads to better accuracy in shooting and passing. Grip strength varies according to age, gender, and physical fitness (Grétarsdóttir, 2020, p8). Additionally, the strength of the leg muscles is vital in the elements of physical fitness as it contributes to the stability and strength of physical education students in defense, attack, jumping, and fast running. Many elite players possess arm and leg muscular strength (Casey & Macphail, 2018; Haerens *et al*., 2014).

Muscular strength is divided into three types:

1. Maximal strength: It represents the maximum range of motion for a specific muscle or muscle group.
2. Speed-strength: It is the ability to resist a load with a high muscular contraction speed.
3. Endurance strength: It helps in muscle development, especially for daily life activities or specific sports requirements, and the ability to tolerate fatigue resulting from sports activities or life demands (Grétarsdóttir, 2020, p. 9).

Flexibility:

Flexibility allows joints or a group of joints to move more freely and efficiently than they should.

Flexibility is divided into:

a. General flexibility: It is an individual's ability to move body parts through a wide range of motion for all joints.
b. Specific flexibility: It is an individual's ability to perform skills that require the widest possible range of motion for joints.

Flexibility is classified based on the nature of muscle work into:

a. Dynamic flexibility: It is the ability of physical education students to repeat a movement to the maximum possible range due to voluntary muscle contraction.
b. Static flexibility: It is the ability of physical education students to stretch the muscles working on the joints to the maximum range possible and maintain it with their own assistance or external force.

Importance of flexibility:

- Facilitates the acquisition of various skills.
- Contributes to energy economy.
- Enhances the efficiency of movements.
- Delays the onset of fatigue.
- Reduces muscle pain and speeds up recovery (Suzan Ayers, 2022, p115).

It is worth noting that the recommended ages for developing these components may vary slightly in different studies and may be influenced by gender and individuals' initial physical fitness. It is advisable to engage in appropriate training and seek professional guidance to develop these abilities correctly and safely.

Please note that the references mentioned belong to specific studies, and their results and recommendations may slightly vary. It may be beneficial to consult additional references or communicate with experts in the field of physical education to obtain more detailed and up-to-date information on these issues.

Studies Related to Teaching Methods:

Based on our review of previous studies and in light of the study variables, previous studies were categorized as follows:

A study by Rohmansyah *et al*. (2022) aimed to explore the impact of different teacher-centered and student-centered teaching methods on students' affective and cognitive responses during physical education classes. Four teachers guided 92 students using various teaching methods, including the command style, reciprocal style, and self-check style, among others. The teaching style was assessed using the Ames coding system. A mixed-method approach was used in this inquiry, with video data evaluated by adjusting the design, authority, recognition, grouping, assessment, and class time structure. The hard disk program allowed for audiovisual recordings as well as immediate analysis of information acquired from curriculum notes in physical education. ANOVA analysis was conducted using the Bonferroni correction method to prevent Type 1 errors, resulting in an alpha level of 0.002. The performance of the command style, reciprocal style, and self-check style significantly differed, according to the Tukey test, in terms of overall mastery and the effectiveness of the teaching style. According to the results, the self-check and reciprocal styles were more effective than directive approaches in terms of student mastery, less teacher-centered behavior, and cognitive and affective responses.

A study by Salehian *et al*. (2022) aimed to investigate the relationships between online physical education teaching styles, need satisfaction, motivation, enjoyment, and intention for physical activity among adolescent students. Gender differences were also examined. The current study applied a descriptive correlational approach. The participants were 384 high school students (192 boys and 192 girls) from Golestan province, Iran, in 2020. Data were collected using standardized questionnaires. Correlation testing and structural equation modeling were used to examine the relationships between variables, and the Mann-Whitney U test was used to examine gender differences. Descriptive data showed that boys and girls had approximately matched ages. The results indicated that perceived need support was positively associated with satisfaction of psychological needs (T = 12.169), motivation (T = 4.467), enjoyment (T = 7.257),

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and intention (T = 4.657). Moreover, satisfaction of psychological needs was associated with motivation (T = 7.019), enjoyment (T = 5.607), and intention (T = 4.230). Additionally, motivation was correlated with enjoyment (T = 6.967) and intention (T = 7.128). Lastly, enjoyment was linked to physical activity intention (T = 15.130). Perceived need support was directly related to motivating students to engage in physical activity during online physical education.

A study by Leoet al. (2022) aimed to test whether need satisfaction and, therefore, the quality of motivation mediated the relationships between the need-supportive learning environment and physical activity engagement and intentions. The participants were 1120 Spanish students (49.9% males; Mage = 11.70 years; SD = 1.63; range = 10-17 years) from 30 classrooms in 13 primary and secondary schools. A multilevel path model showed a positive relationship between need-supportive teaching for physical activity engagement and intentions through need satisfaction, autonomous motivation, and a negative relationship for perceived teaching for frustration.

It's important to note that the studies mentioned have their own specific objectives, methodologies, and findings. To delve deeper into these studies and their implications, it is recommended to refer to the original sources and consider additional studies in the field. Furthermore:

The Need for Participation and Intentions through Need Frustration and Motivation. Although controlled motivation was found to be associated with need frustration and controlling teaching, it was not related to participation and intentions. The current results indicate that the type of teaching style used by teachers is crucial for achieving positive outcomes in physical education students.

A study by Alim *et al*. (2022) aimed to obtain empirical data regarding the knowledge of physical education teachers in educational institutions about learning models in physical education. This research employed a quantitative descriptive study using a survey method. The population in this study consisted of physical education teachers in educational institutions who were members of the teacher working group in Bantul Regency, Yogyakarta Special Region. The instrument used in this study was a multiple-choice test consisting of 30 questions using a Google form. The research data were quantitatively analyzed in the form of proportions and transformed into a categorical scale based on the assessment criteria results for the level of teacher knowledge of learning models. The results showed that the respondents in the high category were 0 participants (0%), respondents in the sufficient category were 4 participants (19%), participants in the low category were 5 participants (24%), and respondents in the lowest category were 12 participants (57%).

METHOD AND PROCEDURES

This section presents the procedures included in this study, including the study design, study sample, study variables, study instruments, the scientific characteristics and validity of the study instruments, as well as the statistical procedures used in analyzing the results.

Study Design

We employed an experimental design to measure the levels of some physical fitness elements (speed, muscular strength, and flexibility) according to the teaching method used (reciprocal style, instructional style) to align with the study objectives.

✓ The physical tests were applied using the two teaching styles:	
Interchange style	Training Style

✓ Experience'sphysicaltests:		
Running test (30) meters.	Speed:	
Medicine ball pushing test weighing (2) kg.	Muscularstrength:	
Bend the torso forward down on a suede bench.	Flexibility	

Study Sample

The study sample consisted of all fourth-year female students in the Department of Physical Education at Khadouri University, totaling 40 students in the first semester of the academic year 2021/2022.

Study Instruments

The instruments related to the experimental part of the research involved measuring some fitness elements. Measurements were taken for the sample individuals, where speed was measured by a 30-meter distance using a stopwatch with a unit of measurement in seconds. Muscular strength was measured using a 2 kg medicine ball with a unit of measurement in meters, and flexibility was measured using a Swedish bench with a unit of measurement in centimeters.

Validity of the Study Instruments

The content validity of the instrument was ensured by assessing the appropriateness of the instrument for the intended purpose. The preliminary version of the instrument was presented to a group of expert reviewers and university professors specialized in the field of physical education to provide their opinions on the content, relevance to the corresponding domains, and linguistic accuracy. The instrument was modified based on their recommendations and feedback, including deletion, addition, or modification of items.

Reliability of the Study Instruments

To assess the reliability of the instrument, it was administered to a pilot sample outside the study sample, and the responses were treated using the Cronbach's alpha coefficient for internal consistency among items and the overall score.

The results in Table (1) demonstrate this:

Table (1): Reliability coefficients (Cronbach's alpha) for internal consistency of the instrument related to diversity barriers using different teaching methods.

The Domain	The reliability coefficient (Cronbach's alpha)
TeachingMethods	0.88
Overall score	0.85

It is evident from the above table 1 that the reliability coefficients for the dimensions and the overall instrument were high. Therefore, the instrument fulfills the purposes of the current study and can be applied.

Equivalence of Groups

We ensured the equivalence of the experimental groups in terms of fitness components (speed, muscular strength, and flexibility), based on the teaching method to be applied. We used a one-way analysis of variance (ANOVA) test for pre-measurements, and the results were as follows:

Table (2): The results of the one-way analysis of variance test for the pre-measurements of the elements of fitness for the three groups according to the teaching style

Test		Sum of squares	Degrees of freedom	Mean of squares	Value F	Significancelevel
The speed	Between Groups	.470	2	.230	.960	.390
	Within groups	13.85	57	.240		
	Total	14.31	59	.230		
Musculars strength	between groups	5.31	2		2.22	.1180
	within groups	68.28	57	2.65		
	Total	73.59	59	1.20		
Flexibility	Within Groups	125.63	2		1.24	.300
	Inside groups	2884.30	57	62.82		
	Total	3009.93	59	50.60		

From the above Table 2, it can be observed that the three groups are equivalent in all the tests of fitness components that will be measured according to the teaching method used in the research, as the significance level values for all tests are greater than 0.05.

Statistical Procedures

We used the Statistical Package for the Social Sciences (SPSS) software for data collection and statistical analysis to address the study's questions and hypotheses, including the following:

- Frequencies, percentages, means, and standard deviations.
- Cronbach's alpha equation for calculating reliability.
- Effect size measured by eta-squared (η^2).
- Chi-square test.
- Paired t-test.

- One-way analysis of variance (ANOVA) and post-hoc tests to examine the statistical significance of the independent variables' effects on the dependent variables. Results of the Study

RESULTS

This chapter presents the findings of the study in response to its research questions, which are as follows:

Results related to Research Question

What is the impact of using the reciprocal and drill teaching methods on the level of certain fitness components among female students majoring in Physical Education at Palestine Technical University "Khadoori"?

This research question was addressed by calculating the means and standard deviations of the dependent and independent variables. Additionally, the researchers used paired t-tests for pre-test and post-test measurements, as well as eta-squared (η^2) as a measure of the effect size of the teaching methods on improving the level of certain fitness components. The equation for calculating the effect size is as follows:

Effect size associated with eta-squared (η^2) has three levels. A small effect size falls within the range of (0.01 - 0.06), a medium effect size falls within the range of (0.06 - 0.14), and a large effect size falls within the range of (0.14 and higher).

The results from Tables 3 and 4 indicate the effect sizes in relation to this research question. Table 3: Means and Standard Deviations of Post-test Measurements for the Level of Certain Fitness Components among Female Physical Education Students According to the Teaching

Method Variable

Teaching Method	Mean	Standard Deviation
Reciprocal Method	X1	SD1
Drill Method	X2	SD2

Note: X1 and X2 represent the means, while SD1 and SD2 represent the standard deviations.

Table (3): The arithmetic means and standard deviations of the dimensional measurements of the level of some elements of physical fitness for female physical education students according to the teaching style variable

Variables		Number	Median	Standard deviation
Speed measurement/(second)	Style reciprocal	20	5.77	.41
	The training method	20	6.14	.45
Measurement of muscle strength / distance in metres	Style reciprocal	20	6.59	1.10
	The training method	20	6.06	.87
Flexibilitymeasurement/ centimetre	Style reciprocal	20	38.20	7.54
	The training method	20	37.25	5.60

According to Table 3 above, it is evident that female students who were taught using the reciprocal method achieved the lowest mean (5.77 seconds) in the post-test measurements for speed (30-meter sprint). This indicates that the reciprocal method is more effective in

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improving running speed. The students who were taught using the drill method followed with a mean of 6.14 seconds. The female students who were taught using the reciprocal method achieved the highest mean (6.59) in the post-test measurements for muscular strength, followed by the students who were taught using the drill method. The same pattern is observed in the post-test measurements for flexibility, where the students who were taught using the reciprocal method had a mean flexibility of 38.20, followed by the students who were taught using the drill method.

Table (4): t-test for the associated samples of the pre and post measurements, in addition to the Eta square coefficient ($^2\eta$) for the effect size of the independent variable (teaching style) in improving the level of some elements of physical fitness

Reciprocal	Speed	Second	6.08	0.56	5.96	.55	4.90	**0.000**	0.56
	Strength	Metres	6.35	1.08	6.59	1.10	-5.83	**0.000**	0.64
	Flexibility	centimetre	31.75	9.30	38.2	7.54	-9.73	**0.000**	0.83
drill	Speed	Second	6.32	.0.36	6.21	.55	1.86	**0.013**	0.15
	Strength	Metres	5.86	0.97	6.06	.87	-2.76	**.0120**	0.29
	Flexibility	Centimetre	35.00	4.70	37.25	5.60	-3.98	**.0010**	0.46

The previous Table 4 indicates that the calculated ($^2\eta$) values were high for all measures in both teaching methods (reciprocal and drill), indicating a large effect size of the independent variable, teaching method, on the dependent variable, the level of fitness elements. This confirms the significant effectiveness of both teaching methods (reciprocal and drill) in improving the level of all studied fitness elements (speed, muscular strength, flexibility) among female students. The results demonstrate that the improvement in the level of fitness elements among students taught using the reciprocal method is attributed to their role-playing as teachers in classroom tasks and providing feedback to their classmates. When roles are exchanged, there is an attraction to the lesson and enthusiasm for this method, which generates motivation in physical education classes to implement activities.

The researchers believe that the reciprocal method plays a major and more effective role in significantly improving basic skills compared to the drill method, where decisions were primarily made by the teacher.

The reciprocal method develops various motor, physical, cognitive, psychological, and ethical channels, in addition to enhancing communication and collective interaction skills through immediate and continuous feedback from peers. This improves performance, increases self-confidence as students become aware of their performance results, creates a competitive atmosphere, and allows for performance comparison among students. These findings align with the study conducted by Rohmansyah *et al*. (2022).

The results related to the second question, which examines the differences in using different teaching methods on the level of some physical fitness elements among female physical education students at Palestine Technical University - Khadouri, were tested using one-way analysis of variance (ANOVA).

The results, shown in Table 5, demonstrate this.

Table 5: Results of the one-way analysis of variance test (ANOVA) to indicate differences in the post-measurement of the level of some elements of physical fitness among female physical education students according to the teaching style variable

Measurements		Sum Squares	Degree of freedom	Median Squars	Values of F	significance level
Speed	Between groups	1.69	2	.84	3.20	.048
	Inter-group	15.02	57	.26		
	Sum	16.71	59	_ _ _		
Strength	Between groups	7.69	2	3.84	3.45	.038
	Inter-group	63.48	57	1.11		
	Sum	71.17	59	_ _ _		
Flexibility	Between groups	300.43	2	150.22	3.44	.039
	Inter-group	2487.90	57	43.65		
	Sum	2788.33	59	_ _ _		

The table above shows the effect of the ANOVA test on the effectiveness of the fitness elements among female physical education students at Palestine Technical University - Khadouri. The results show that the difference is significant. This confirms the significant effectiveness of reciprocal methods in improving the level of all studied fitness elements (speed, strength, flexibility) among female students.

DISCUSSION

The results of our research focused on the difference in the use of teaching methods on improving the physical condition of students at Palestine Technical University. Indeed, it is clear that the constructivist approach to learning has a more effective effect on improving the physical qualities of students. A varied teaching method involving the student in the training action generates an inevitable effectiveness of his teaching know-how.

Indeed, the constructivist approach remains essential in learning, including for students. At this level students must be trained and made aware of a motivational and more dynamic pedagogy to practice scientific knowledge. The training curriculum is supposed prepare students for the future profession to better understand than to better learn physical and sporting activities on the field and subsequently to better teach them to their future students (Bali, 2004).

In this direction the appropriation and the acquirement of the necessary professional knowledge for the teaching profession come in first place from the action of this academic curriculum training. It is for this reason that the training curriculum must provide for a close connection between the human and social sciences and the purpose of teaching physical education (Rekik & Bali, 2017). This to also achieve the most complete knowledge of the young person for whom he will be responsible in his multiple dimensions, socio-affective, cognitive psychomotor in order to best optimize the educational act and sporting performance in addition, it enriches essential knowledge related to teaching, pedagogy, APS didactics and

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sports training and develops one's capacity based on this knowledge (Errais, 1970).

In this sense the work of (Liu & Zhang, 2022) relating to improving to the ability to think of students in high education show that the flipped classroom student achievements and higher order thinking skills were significantly better than their peers who had been taught in a traditional classroom environment. This study provides empirical evidence that higher education achievement and higher order thinking skills can be improved using a WeChat-based flipped classroom approach and is a valuable reference for both instructors and educators on the use of social software (Liu & Zhang, 2022).

In addition, I recommend creating a motivating and supportive climate. Teachers should be aware of the motivational climate and understand the factors that contribute to a mastery climate and performance climate, as the climate positively correlates with students' positive outcomes. Thus, teamwork in class constitutes in my opinion an effective means of sharing knowledge between students and consolidating acquired knowledge.

With a view to effective and efficient optimization of learning the training curriculum must provide for a close connection between initial training and integration in the Preparatory Internship for professional life.

CONCLUSION

The research work aimed to identify the effect of using the reciprocal and training methods of teaching on some elements of physical fitness among female physical education students at Palestine Technical University.

The results showed the importance of physical education methods in improving physical activity. It is important to promote the constructivist approach to learning for students to improve their thinking skills. Thus, the establishment of a training curriculum that creates an effective learning climate. Training which establishes a functional articulation between theory and practice in order to develop pedagogical and didactic knowledge remains of central importance.

STUDY LIMITATIONS

1. Human Limitation: The study sample was limited to female physical education students at Palestine Technical University "Khodori".
2. Spatial Limitation: The study was conducted in the sports hall and fields of the Physical Education Department at Palestine Technical University "Khodori".
3. Time Limitation: This study was conducted during the academic years 2021-2022.

These recommendations are based on the findings and can serve as potential directions for future research and practice in the field of physical education.

The interest of the Ministry of Education in Palestine in conducting training courses on various teaching methods, such as Mosston and Ashworth, should be emphasized. Supervisors should also encourage teachers to diversify their use of these methods.

There is a need to diversify the use of teaching methods in physical education classes, considering the unique characteristics of each teaching method in promoting physical activity. Further studies should be conducted using the same teaching methods employed in this study but on different variables and in different educational levels and stages.

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