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Effectiveness Of Using Modified Jigsaw Method Based On Individual And Group Competition To Learn Some Basketball Skills And Cognitive Achievement

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Abstract

Objectives: To examine the effectiveness of a modified Jigsaw method incorporating individual and group competition in improving selected basketball skills and cognitive achievement among university students. The study also compared the outcomes of individual-competition and group-competition formats.
Materials and Methods: An experimental pretest–posttest design involving two equivalent experimental groups was employed. Participants were 60 first-year male students selected by lottery from two sections at the Faculty of Physical Education and Sports Sciences, University of Mosul, during the 2023–2024 academic year. Group equivalence was established for the main demographic variables and selected physical-fitness and motor-ability components associated with basketball performance. The first group received modified Jigsaw instruction based on individual competition, whereas the second group received modified Jigsaw instruction based on group competition. The program was implemented for six weeks, with one instructional unit per week. Selected basketball skills and cognitive achievement were assessed using pretests and posttests.
Results: Both modified Jigsaw formats improved students' cognitive achievement and performance in the selected basketball skills. However, the individual-competition group demonstrated better posttest cognitive and skill-performance outcomes than the group-competition group.
Conclusions: The modified Jigsaw method was effective in supporting the learning of selected basketball skills and related cognitive knowledge. Incorporating individual competition into the method produced better outcomes than incorporating group competition, suggesting that this format may be a useful instructional strategy in university basketball courses.

Keywords: Modified Jigsaw Method, Individual And Group Competition, Basketball Skills, Cognitive Achievement.

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Introduction

Progress of scientific serves as a fundamental benchmark for measuring development and advancement of institutions. Countries that possess advanced science, knowledge, and technology are undoubtedly at forefront in various sectors. This perhaps explains significant attention given to scientific research and its applications, as nations now compete to achieve scientific, technological, and intellectual supremacy, utilizing education as a means to attain this superiority.

Education is mirror that can reflect what society will be like, its goals, concepts, and philosophy. It is the successful tool for determining its directions, growth, and achieving essential goals. This is what makes advanced nations strive to develop their educational methods and systems so that they can keep pace with amazing developments in field of science, based on their belief that education is the best way to invest in their children, who are considered real capital, and on real awareness that science is a method of work that must be reflected directly in lives of individuals to change society for better.

Researchers have confirmed that there are important foundations that must be taken into account at beginning of learning process and during it, in addition to main one, which is one of the most important conditions for learning motor skills. Practice is not just a repetition of movement, but rather a repetition accompanied by reinforcement and modification, i.e., appearance of a gradual improvement in performance as a result of correcting mistakes and praising correct performance.

Educators emphasize importance of modified Jigsaw method in learning different skills, especially with new skills and in early age stages, due to its effect on consolidating mental learning processes in learners.

Basketball requires special effort that goes beyond simply learning technique and being able to play it. It also involves other physical, psychological, and educational aspects. These factors have made game difficult and limited its popularity, especially among students, using modern methods and assigning task to educational coaches has proven that these difficulties can be overcome, leading to game's spread and expansion of its base. (Jassem, 2014, p. 64)

Importance of this study emerged in identifying effectiveness of modified Jigsaw method, according to individual and group competition to learn some basketball skills, problem addressed by current study is urgent need to improve teaching methods and approaches used in teaching one of fields of knowledge in physical education and sports sciences, namely basketball. Some of researchers who represented this game in one of University of Mosul's championships felt and experienced game and its skills, and learned about reluctance to participate in it. This prompted need to find a method that facilitates learning skills of this game, in addition to raising level of skill and knowledge achievement among students and developing their self-confidence. It is known that basketball is not considered one of popular games like other sports such as football and volleyball, and therefore learning its skills is something that students find difficult to master, idea of this study came about to find a method that enables students to master these skills, the researchers seek to experimentally verify effectiveness of modified Jigsaw method according to individual and team competition in teaching basketball to first-year students in Faculty of Physical Education and Sports Sciences, to define problem, the researchers seek to answer following question: What is effect of using modified Jigsaw method on individual and group competition in technical performance and cognitive

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achievement of some basketball skills for first-year students in Faculty of Physical Education and Sports Sciences?

The current study aims to figure out effectiveness of using modified Jigsaw method, based on individual and group competition, in developing skill performance between pre- and post-tests for some basketball skills was revealed. Identifying differences in modified Jigsaw style according to individual and group competition on skill performance of some basketball skills in post-test. Identifying differences in modified Jigsaw method based on individual and group competition regarding cognitive achievement of some basketball skills in post-test.

Research hypotheses there are no statistically significant differences in average scores of pre-test and post-test among students of first experimental group, which used modified Jigsaw method based on individual competition in developing skill performance of some basketball skills, there are no statistically significant differences in average scores of pre-test and post-test among students of second experimental group, which used modified Jigsaw method based on group competition in developing skill performance of some basketball skills, there are no statistically significant differences in post-test between average scores of students in first experimental group, which used modified Jigsaw method based on individual competition, second experimental group, which used modified Jigsaw method based on group competition, in developing skill performance of some basketball skills, there are no statistically significant differences in post-test between average scores of students in first experimental group, which used modified Jigsaw method based on individual competition, second experimental group, which used modified Jigsaw method based on group competition, in developing cognitive achievement of some basketball skills.

Terms Defining

Modified Jigsaw method: It is one of cooperative learning methods based on dividing students into small, heterogeneous groups, then dividing educational content into parts or tasks so that each student specializes in a specific part of material within his group, then returns to same group to teach his colleagues what he learned from his material. This modified method is characterized by introducing some modifications such as increasing role of teacher in terms of guidance and providing feedback (Al-Kamel, Hassanein, 2014, 75).

Research Methodology

The researchers resorted to using experimental method to suitability of study nature, study community and its sample consisted of first year students of Faculty of Physical Education and Sports Sciences for academic year (2023-2024), who were selected purposively, as basic skills for basketball activity are taught in first academic year. Their number was 285 male and female students, representing 9 sections A-B-C-D-E-F-G-H-Y and section A for female students, whose number was 28 female students, who were excluded from study community due to difference in gender variable, so study community became 257 students, sample consisted of two sections out of a total of eight, after excluding section A for female students, two sections were selected randomly using a lottery system, and included sections B and F, methods were randomly

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distributed among them, section B had 31 students and section F had 29 students, for a total of 60 students in study sample.

The researchers excluded a number of students from experimental groups, namely number of students who had their year postponed is (2), number of students who did not attend study tests is 6, number of students who were absent from educational units by 2 lectures or more is 14. After this exclusion, number of students within each group settled at 19 students per group, representing 14.78% of study community excluding female students' section.

Experimental Design

One of important things that must be done before conducting study is choosing experimental design, the researchers adopted equivalent groups design with pre-test and post-test, as it is suitable for nature, requirements and objectives of study. (Van Dalen, 1985, 366)

Groups	Pre-test	Independent variable	Post-test
First experimental	Skills acquisition	Modified Jigsaw method for individual competition	Skills acquisition cognitive achievement
Second experimental		Modified Jigsaw method based on group competition	

Figure 1. Experimental design illustrates

Equivalence of research groups

Equivalence of variables related to anthropometric measurements: Length measured in centimeters. Weight measured in kilograms. Chronological age measured in years as shown in Table (1).

Table 1. Means and standard deviations of the groups for some variables of age, height, and mass, calculated (t) value

Variable	Experimental group		Control group		Calculated (t) value
	Mean	St.d	Mean	St.d	
Age/month	227.62	13.25	225.32	15,13	1.536
Height/cm.	173.47	4.88	174.52	3.16	1.04
Mass/kg	65.76	7.27	67.64	8.37	1.255

Tabular (t) value for freedom degrees (36), error margin of (0.05) = 2.028

Table (2) shows that there are no statistically significant differences among students of the groups in above variables, as calculated t-value was less than tabular value, which indicates that the groups are equal in these variables.

Equivalence in Physical Fitness Tests

Identifying physical fitness elements that influence basketball skills training: In order to identify most important physical attributes that affect basketball skills, and after analyzing content of scientific sources (Alawi & Radwan, 1981; Hassanin, 1995; Othman, 2005; Al-Janabi, 2019), questionnaire was designed and presented to a group of basketball, measurement, evaluation specialists to identify physical attributes and elements of physical fitness that affect skill learning. Table (2) shows agreement of specialists regarding identification of the most important physical attributes, which received a

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percentage of agreement of (75%) or more. Bloom et al. indicate that "researchers must obtain agreement of (75%) or more from opinions of reviewers," according to order of these attributes. (Bloom et al., 1983, p. 126).

Table 2. Percentage of agreement among experts regarding identification of the most important physical characteristics.

Physical abilities	Specialists Number	Agree	Percentage
Arm explosive power	7	7	100%
Leg explosive power	7	7	100%
Agility	7	7	100%
Power	7	7	100%
Speed endurance	7	4	57.14%
Reaction	7	4	57.14%
Flexibility of lower limbs	7	3	42.85%
Flexibility of upper limbs	7	3	42.85%
Leg muscles strengthening	7	3	42.85%
Endurance	7	2	28.57%

Identifying tests for physical fitness components

After analyzing content of scientific sources, necessary tests for measuring selected physical attributes were chosen and put into the form of a questionnaire, questionnaire was presented to a group of specialists in measurement, evaluation and basketball to determine physical tests for selected physical attributes that serve research objectives. Table (3) shows agreement of opinions of specialists regarding determination of physical tests and their percentages, which obtained a percentage of (75%) or more, according to sequence.

Table 3. Percentage of expert agreement on definition of physical abilities tests

Physical abilities	Physical tests	Specialists Number	Agree	Percentage
Arm explosive power	Test of pushing a medicine ball forward weighing (3) kg from a seated position on a chair.	7	7	100%
Leg explosive power	Standing broad jump test.	7	7	100%
Agility	Barrow test (3 * 4.5 meters).	7	7	100%
Power	10-second arm flexion and extension test.	7	6	85.71%

After agreeing on selection of tests to measure elements of physical fitness, then conducting an equivalence between the groups in selected elements of physical fitness, as shown in Table (4).

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Table 4. Arithmetic means and standard deviations of the groups for age, height, mass, and calculated t-value.

Variable	Experimental group		Control group		Calculated (t) value
	Mean	St.d	Mean	St.d	
Arm explosive power	3.64	0.77	3.126	176.0	1.34
Leg explosive power	2.07	0.38	2.12	0.18	1.19
Agility	10.86	1.47	11.01	1.19	1.53
Power	11.86	1.69	12.12	1.79	1.25

Tabular (t) value for freedom degrees (36) and error margin of (0.05) = 2.056

Table (4) shows that there are no statistically significant differences between the groups in variables of elements of physical fitness, calculated (t) value for physical fitness tests, as in table above, is all insignificant, as all calculated t values are less than percentage of tabular (t) value, and this indicates equivalence of sample members in elements of physical fitness.

Identifying educational material

To begin implementing experiment, it was necessary to identify skills required for basketball course for first-year students at Faculty of Physical Education and Sports Sciences University of Mosul. This identification was carried out by departmental committee and basketball instructors teaching first-year course, skills included in first semester's curriculum were determined according to departmental committee's syllabus, in light of college's curriculum, and they include: Skill: Passing with both hands over head. Skill: Dialogue in its three types (high, low, by changing direction). Skill: Free shooting. Skill: Shooting from a jump. Skill: Ladder shooting. After that, an interview was conducted with a number of specialists from teaching staff of basketball, to agree on validity of tests used for apparent performance of each of skills used in research.

Determining grades of apparent construction sections for some basketball skills

Test consists of performing technical steps of skill, represented by preparatory, main, and final parts of each skill. A technical performance evaluation form for skills was prepared for purpose of evaluating technical performance of skills for research groups, form was presented to a group of specialists in basketball, measurement, and evaluation in order to give a score for each part of skill, sum of three parts is out of (10).

Scientific basis for a questionnaire to determine scores of apparent structure sections of some basketball skills

Face validity of questionnaire: The researchers presented technical performance evaluation questionnaire, prepared in its initial form, to a group of specialists in field of measurement and evaluation and basketball teachers to determine the degree of

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performance and its sections, its suitability for application to selected research sample, and whether test actually measures what it was prepared for.

Objectivity: The researchers verified objectivity of measurement of technical performance judges who provided assistance in evaluating technical performance of students in the two groups, by directly evaluating technical performance of post-test for sample students from first academic year/College of Physical Education and Sports Sciences, for three judges to evaluate technical performance according to prepared form to identify their objectivity in evaluation process used multiple correlation equation between scores of judges, which amounted to (0.88) between first and second judges, (0.86) between first and third judges, and (0.85) between second and third judges. This indicates that objectivity of evaluators in assessing technical performance is high. With this procedure, measure of technical performance has met its scientific foundations and is valid for application to current sample.

Conducting equivalence tests (pre-tests) for the groups

Equivalence was established between the groups in skills under study after obtaining students' scores from experts, as shown in Table (5).

Table 5. (t) test for the groups shows equivalence in skill tests

Variable	Experimental Group 1		Experimental Group 2		Calculated (t) value
	Mean	St.d	Mean	St.d	
Overhead Pass	2.36	0.96	2.55	0.52	0.71
High Dribble	3.57	0.91	3.5	0.75	0.63
Low Dribble	3.75	0.85	3.73	0.81	0.55
Dribble with Change of Direction	2.82	0.72	2.51	0.85	0.52
Free throw	2.96	1.05	3.25	1.14	0.86
Jump Shot	2.2	0.93	2.35	0.86	0.77
Layup Shot	2	68.0	2.55	0.78	0.89

Tabular value of (t) for degrees of freedom (36) and a margin of error of (0.05) = 2.056

Table (5) shows that there are no statistically significant differences between the groups in skill test variables, as calculated (t) value, all of which are less than tabular (t) value of (2.028). This indicates that there are no differences, and this indicates equivalence of sample in the above variables.

Cognitive Achievement Test

The cognitive achievement test prepared by (Anad, 2019) was used, which has a total of (26) test items. Each item has four alternatives, one of which represents correct answer.

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As for method of scoring, we give a mark of (1) for correct answer and (0) for incorrect or unanswered answer.

Identifying and adjusting search variables

Independent variables are modified Jigsaw style for individual competition, modified Jigsaw style is based on team competition.

Dependent variables are: Skills acquisition, Cognitive achievement.

Non-experimental (extraneous) variables: First: Internal design integrity: Internal integrity is achieved after researchers confirm control over extraneous factors that may influence dependent variable. These factors are: Experimental conditions: nothing happened that affected the course of experiment. Equipment and tools used: This factor was controlled using same tools for both research groups. Experimental extinction: Students in research groups who were absent for (2) lectures throughout duration of program were excluded, and their results and numbers are attached to Table (1).

Second: External safety of design: Interaction of effect of experimental (independent) variable with selection biases: This factor has no effect because selection of sample was random and equivalence was achieved between the groups, effect of experimental procedures: educational program was implemented without informing students of objectives and its purpose, in agreement with subject teacher. Subject teacher: basketball instructor at College of Physical Education and Sports Sciences for first academic year applied program's contents to the groups, after agreeing with him on teaching method, in order to avoid difference in factors related to instructor and their impact on the students' (skill) achievement, time period of the experiment: duration of experiment was equal for the groups, as experiment started on (20/11/2023) and ended on (25/12/2023) for a period of (6) weeks and at a rate of (6) units for each group if time of educational unit reached (90) minutes.

Distributing the lecture schedule: The researchers, in cooperation with coordinator of team sports department responsible for preparing schedule, were keen to organize weekly schedule in a way that ensures time proximity for giving material. In event of a malfunction or occasion, lecture is replaced by another lecture in order to give an equal opportunity in the number of lectures for the groups.

Preparing lesson plans (Educational program)

After reviewing scientific sources, previous studies, and relevant research, and through personal interviews with professors of teaching methods and basketball, a questionnaire on teaching plans (educational program) was designed and presented to a group of specialists in field of basketball teaching methods in order to express their opinions and observations on teaching plans (educational program) and to determine their validity and suitability for sample. Each model included, in accordance with method, following: Preparatory section (Introduction, General preparation, Specific preparation). Main part (educational activity , practical activity). Final part: teaching plans (educational program) included (12) educational units distributed over two experimental groups, with (6) units for each group, duration of each educational unit was (90) minutes, with one unit per week.

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Pilot study

Pilot study was conducted on 11/13/2023 on a sample from study community similar to sample and not participating in the groups, and on a part of students of section H, numbering (22) students in first academic year, in order to identify the most important obstacles and observations that may face educational program. One of objectives of pilot study was: Ensuring teacher's (experiment implementer's) ability to implement educational units. To determine suitability of basketball hall for implementing educational units, possibility of using and implementing proposed methods on sample, extent of validity and timing of each part in educational unit, extent to which students can continue performing without feeling bored and tired.

The researchers concluded following: ability of teacher (experimenter) to implement educational units, suitability of hall, equipment, and tools used during lesson, possibility of using and implementing proposed methods on first-year students, ability of sample to continue performing and not feel bored or tired.

Applying the main experiment

Upon completing requirements for conducting the research experiment, including preparing groups according to achievement divisions, ensuring equivalence between them, and identifying previously mentioned scientific material, experiment was implemented on (20/11/2023), subject teacher research groups were taught to avoid influence of subject teacher and its impact on results of experiment, first experimental group was taught using modified Jigsaw method based on individual competition. While second experimental group was taught using modified Jigsaw method based on group competition, groups continued to be taught throughout first semester (2023-2024) according to teaching plans for each group, work of groups can be explained as follows:

The first experimental group, represented by section (B), implemented the educational program using modified Jigsaw method based on individual competition. According to following steps: students were divided into cooperative groups, with students in each group remaining as constant as possible throughout experiment. Then method is applied by teacher dividing material into parts so that each student in one group is given a specific part of material, and then this student returns to his group and teaches this part to his colleagues, lesson was implemented according to part-based method (gradual development), when passing through part assigned to student, student teaches it to his classmates, subject teacher is one who gives order to start and end implementation of skill exercises. After exercises are completed, teacher conducts a competition between groups by conducting a test of skill that was done in educational unit, and through evaluation form he has, he calculates scores to obtain winning student (individual evaluation).

Second experimental group: represented by section (D): This group implemented educational program using modified Jigsaw method based on group competition. Following same previous steps, but difference is in group competition, so that evaluation is based on result calculated for group and not for the individual.

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Post-test

After completion of educational program, a post-test was conducted for each of three groups on Tuesday, January 2, 2023, in basketball hall at College of Physical Education and Sports Sciences/University of Mosul.

Technical Performance Evaluation

Technical performance assessment of skills under study was conducted in person by experts on January 2, 2024. experts evaluated students' performance directly, using scientific observation methods, each expert individually, based on a prepared performance evaluation form. Experts in technical performance of sample students by giving A grade for each student's artistic performance then extraction middle calculation between degrees experts three to obtain final grade for technical performance per student.

Conducting a cognitive achievement test: This test was conducted on 3/1/2024, where the researchers agreed with branch coordinator to set a specific date for the groups to carry out post-test.

Statistical methods

Simple correlation coefficient (Pearson). Test (T). Spearman's equation is the multiple correlation coefficient. Percentage.

Results and discussing

Presentation and discussion of results of first research hypothesis

To verify first hypothesis, which states that there are no statistically significant differences in average scores of pre-test and post-test among students of first experimental group, which used modified Jigsaw method based on individual competition in developing skill performance of some basketball skills, the researchers used (t) test to determine statistical differences among average scores of students of first experimental group between pre-test and post-test of skill achievement test, as shown in Table (6).

Table 6. Arithmetic means and standard deviations of pre-test and post-test, and calculated t-value for first experimental group in skills achievement test

Skills	Pre-test		Post-test		Calculated value (t)
	Mean	St.d	Mean	St.d	
Overhead Pass	2.36	0.96	7.28	1.76	7.75
High Dribble	3.57	0.91	76.6	1.36	7.02

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Low Dribble	3.57	0.85	93.6	17.1	7.79
Dribble with Change of Direction	2.82	0.72	7.03	61.1	7.65
Free throw	2.96	1.05	6.02	2.2	7.42
Jump Shot	2.2	0.93	6.75	1.52	8.16
Layup Shot	2	0.68	5.44	1.36	7.36

Tabular value of (t) in relation to degrees of freedom (36) and a margin of error of (0.05) = 2.056

Table (6) shows that there are statistically significant differences between pre-test and post-test scores of first experimental group in some basketball skills. Based on this result, research hypothesis is rejected and alternative hypothesis is accepted. This indicates effectiveness of modified Jigsaw method according to individual competition in developing skill aspect of sample, attribute this result to fact that modified Jigsaw method, based on individual competition and its steps, met students' skill needs because of teaching steps followed by this method, which were well received by most students, and they were interactive and enjoyed lecture time, which positively affected increase of their skill acquisition and understanding of it and achievement of their requirements in this field.

Ausubel emphasizes possibility of improving memory and learning through use and construction of frameworks to organize and store information in a coherent, logical and meaningful way, as organizing and linking information within skill structure protects new idea from being lost or quickly forgotten, as organized ideas are less prone to being forgotten (Al-Zayyat, 294, 2004-295).

Presentation and discussion of results of second research hypothesis

To verify validity of second hypothesis, which states that there are no statistically significant differences in average scores of pre-test and post-test among students of second experimental group, which used modified Jigsaw method based on group competition in developing skill performance of some basketball skills, the researchers used (t) test for paired samples to determine statistical differences among average scores of students of second experimental group in skill achievement test, as shown in Table (7).

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Table 7. Arithmetic means and standard deviations of pre-test and post-test, and calculated t-value for second experimental group in skills achievement test

Skills	Pre-test		Post-test		Calculated value (t)
	Mean	St.d	Mean	St.d	
Overhead Pass	2.55	0.52	6.01	1.04	7.05
High Dribble	3.5	0.75	5.04	0.85	3.11
Low Dribble	3.73	0.81	5.31	1.4	3.26
Dribble with Change of Direction	2.51	0.85	5.01	1.14	6.45
Free throw	3.25	1.14	5.31	1.04	5.3
Jump Shot	2.35	0.86	5.65	1.18	6.34
Layup Shot	2.55	0.78	5.184	1.223	5.4

Tabular value of (t) for degrees of freedom (36) and a margin of error of (0.05) = 2.056

Table (7) shows statistically significant differences between pre-test and post-test scores of second experimental group in some basketball skills. Based on this result, research hypothesis is rejected, and hypothesis is accepted. This indicates effectiveness of modified Jigsaw method, based on group competition, in developing skill aspect of sample, the researchers attribute this development to role of modified Jigsaw method, based on group competition, in fostering analytical thinking among students. This method is characterized by a spirit of cooperation, harmony, and discussion, providing students with opportunities for active participation and free and harmonious expression of their opinions. It also reduces fear of failure when presenting information through use of reinforcement, equips them with ability to generate new ideas and choose appropriate alternatives, and is based on principle of encouraging students to use their skills to reach understanding and then visual thinking. This has led to positive results that are consistent with students' abilities and potential.

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Presentation and discussion of results of third research hypothesis

To verify third hypothesis, which states that there are no statistically significant differences in post-test between mean scores of first experimental group, which used modified Jigsaw method based on individual competition, second experimental group, which used modified Jigsaw method based on group competition, in developing skill performance of some basketball skills, the researchers used independent samples t-test to determine statistical differences between mean scores of first experimental group and second experimental group in skill achievement test in post-test, as shown in Table (8).

Table 8. Arithmetic means and standard deviations of post-test and calculated t-value for first and second experimental groups in post-test of skill achievement

Skills	First experimental		Second experimental		Sig. level	Calculated value (t)
	Mean	St.d	Mean	St.d		
Overhead Pass	7.28	1.76	6.01	1.04	0.01	3.053
High Dribble	76.6	1.36	5.04	0.85	0.03	3.451
Low Dribble	93.6	17.1	5.31	1.4	0.029	2.954
Dribble with Change of Direction	7.03	61.1	5.01	1.14	0.005	3.024
Free throw	6.02	2.2	5.31	1.04	0.028	2.964
Jump Shot	6.75	1.52	5.65	1.18	0.01	2.763
Layup Shot	5.44	1.36	5.184	1.223	0.015	36.0

Tabular value of (t) in relation to degrees of freedom (36) and a margin of error of (0.05) = 2.056

Table (8) shows that there are statistically significant differences between first experimental group and second experimental group in post-test in some basketball skills, as calculated (t) value for above skills was significant, all of which are significant except for skill of shooting ball, where results showed no statistically significant differences. Based on this result, third research hypothesis is rejected and alternative hypothesis is accepted. The researchers attribute these results to fact that: modified Jigsaw method, based on individual competition, helped to create a positive learning environment and interaction among students within classroom, raising their skill performance and their

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academic achievement level. Teaching according to modified Jigsaw method based on individual competition has made students move from stage of receiving information to joint interaction and group participation, and this makes student focus of educational process. Using modified Jigsaw method based on individual competition helped to attract students' attention and motivate them towards skills. Using modified Jigsaw method based on individual competition in teaching helped to take into account individual differences between students. Using modified Jigsaw method based on individual competition in teaching helped students to enhance their self-confidence, and this is reflected in increased skill achievement.

This is what Novak emphasized regarding meaning-based education. The student uses his information to build his new knowledge, and therefore students should be encouraged to build their knowledge on their own, teacher should help them to make their ideas clear. Students should also be encouraged to do activities so that meaningful learning takes place (Ayesh, 2008).

This result can also be explained by students working in groups, which helped create a collaborative atmosphere among them. In addition to roles they play in each lesson, each role entails a specific duty that increases their sense of responsibility towards rest of their group. This also leads to better performance, especially since they enjoy playing role of teacher, these roles are beneficial as they have led to help reduce fear of making mistakes in front of peers, which can lead to feelings of shyness, hesitation, and avoidance of performance, and instead fosters students' self-confidence. Group members play a role in providing reinforcement, which has a positive aspect, as (James. 2005) mentioned: "Praising results achieved by learner from time to time will serve as a new source of motivation to exert effort and continue progress." (James, 2005)

Presentation and discussion of results of the fourth research hypothesis

To verify fourth hypothesis, which states that there are no statistically significant differences in post-test between average scores of students in first experimental group, which used modified Jigsaw method based on individual competition, second experimental group, which used modified Jigsaw method based on group competition in developing cognitive achievement of some basketball skills, the researchers used independent samples t-test to determine statistical differences between average scores of students in first experimental group and students in experimental group in cognitive achievement test, as shown in Table (9).

Table 9. Means and standard deviations of post-test**,** calculated t-value for first and second experimental groups in cognitive achievement test

Variable	First experimental		Second experimental		Calculated (t) value
	Mean	St.d	Mean	St.d	

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Cognitive achievement	19.46	43.3	14.83	27.4	7.41

Tabular value of (t) in relation to degrees of freedom (36) and a margin of error of (0.05) = 2.056

Table (9) shows that there are statistically significant differences between first experimental group and second experimental group in post-test in cognitive achievement, as calculated value of (t) was greater than tabulated value of t, and this indicates that there are statistically significant differences in favor of first experimental group. Based on this result, fourth research hypothesis is rejected and alternative hypothesis is accepted. The researchers attribute this result to effectiveness of modified Jigsaw method, based on individual competition, in increasing students' awareness and understanding of subject matter. It had a significant impact on addressing problems and obstacles they might encounter during motor and skill performance, which led to an increase in abundance and diversity of their ideas. This strategy put student in a position of greater activity and effectiveness.

This result is also attributed to nature of method, specifically modified Jigsaw method, which incorporates individual competition. This method involves questions and discussions among students within a group regarding skills under study, aiming to achieve optimal performance through intergroup competition. This, in turn, enhances students' cognitive level. As Samara and Al-Adili (2008) emphasize, "An atmosphere completely devoid of competition fails to motivate learners to learn, while an atmosphere where learners compete in friendship and sportsmanship is best educational environment" (Samara & Al-Adili, 2008, p. 74). Similarly, Saidi and Al-Balushi (2009) indicate that this method contributes to developing teamwork, a love of cooperation with others to achieve goals and facts, and a sense of responsibility. This method also plays an effective role in students' acquisition of information related to subject matter. (Saidi & Al-Balushi, 2009)

This indicates that steps of modified Jigsaw method, according to individual competition, and their implementation by students of first experimental group, helped them to distinguish solutions and alternatives set according to foundations on which they were taught, so that students of second experimental group could easily choose the best performance in cognitive achievement test, which made them superior in cognitive achievement test compared to students of second experimental group.

Conclusions

The first experimental group, which studied according to modified Jigsaw method based on individual competition, achieved better results in achievement and skill in some basketball skills. The modified Jigsaw method, based on individual competition, yielded better results in cognitive achievement of some basketball skills compared to the second experimental group.

Recommendations

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Using modified Jigsaw style according to individual basketball competition. Using modern teaching methods in physical education, given their positive and effective impact on learning basketball skills and raising students' achievement levels.

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