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Efficacy of the self-interrogation strategy for developing reflective thinking and learning some basic basketball skills in second intermediate grade students

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ABSTRACT

This study aimed to identify the effect of the self-interrogation strategy in developing reflective thinking and learning some basic basketball skills in fifth-grade students through preparing educational units according to this strategy. With this purpose, the researcher used an experimental design. In the present study, the participants were allocated into two groups, i.e. the experimental group and the control group. The participants of the experimental group received training by the self-interrogation strategy. The participants of the control group continued their studies in the traditional way. The researcher used the appropriate statistical methods to extract the results. Based on the findings of the present study, the researcher concluded that the educational approach used in the experimental group (the self-interrogation strategy) and the curriculum followed by the control group are effective methods in developing the specific basic skills in basketball. However, the students of the experimental group outperformed the students of the control group in the development of reflective thinking and the development of basketball basic skills.

KEYWORDS

Basketball; Self-interrogation strategy; Pretest; posttest; Learning

1. INTRODUCTION

Teaching is a process of communication between the teacher and the learner, which includes the transition of knowledge from one mental state to another mental state. It is a social process through which the information contained in the curriculum decided by the teacher is transferred to the learners (Jennings et al., 2009). Many developed countries have begun to pay a clear interest in building an advanced and developed society with respect to all aspects of life including sports. There

is strong need of modern strategies to reach the high levels of learning. This can only be achieved by continuing and keeping pace with the global development. Nowadays, educational system has become more focused towards implementation of modern strategies to induce learning among players. The selection of appropriate strategies enables them to achieve their goals (Ertmer & Newby). Teaching strategies play an important role in achieving educational goals, and the success of these programs depend on the effectiveness of using these strategies to achieve goals and improve performance. The teaching strategies in which the teacher is the primary and source of information for the learners has become incompatible with the scientific progress.

The self-questioning strategy is one of the meta-knowledge strategies and among the modern strategies that have a major role in the process of active learning. Self-interrogation strategy is a set of procedures and activities that stimulate the student's thinking of the students and enable them to ask questions to themselves, with a keen urge to answer those questions via self-learning or through cooperation with their peers under the guidance of their teacher (Qalladah, 1986). "It is the process of paying attention and observing the situation encountered by the individual, which should be analyzed after thorough understanding, review and the process of evaluation (Badran, 1996). It is based on the questioning of the individual himself and is represented in four main forms.

This strategy seeks to interrogate the learner himself and deduce the main idea stemming from the questions about the idea that was modeled on it in three stages, i.e. pre-learning, during learning, and post-learning stage. This strategy aims to develop sense of responsibility, understand strengths and weaknesses, confront and solve problems, as well as encourage cooperation among the learners themselves, by the use of purposeful exploratory activities. It makes them able to perform tasks through carefully and accurately and to perform activities to learn skills, including basketball skills that students learn in middle schools. It overall helps the students to achieve their goals, encompassing all aspects of the game in terms of scientific and practical aspects to improve skill performance, increase their participation, and urge them to raise their level.

This strategy has an impact on developing the level of learning the skills and especially learning the basic skills and diversifying the use of activities appropriate to the type of skill required to be learned. Hence the self-interrogation strategy for basketball players in the present study as great significance, which further depends on the interrelationship between skills due to the need for connection and coordination, as well as the impact of this strategy on developing reflective thinking to reach the learners to the level we aspire to.

Therefore, the researcher decided to delve into the midst of this strategy in developing reflective thinking in order to learn to be more effective and for students to learn skills according to recent developments in education, and here it lies the importance of the research.

Teaching the basic skills of basketball in most of the training schools is surrounded by a traditional cover in its content. The application of these skills depends on the method implemented by the trainers. Till date there is huge lack of diversification in the use of different modern teaching methods. Use of training methods without taking into account the abilities and capabilities of the students in a class may create a thinking block in terms of failing to express as per their abilities and potential which overall create a huge impact on their playing skills and performances in the games. Hence, the researcher focused on the implementation of self-interrogation strategy to arouse thinking and simultaneously make the learners motivated towards learning basketball skills in a positive way. By giving a variety of experiences and activities based on the scientific foundations in a well-organized way make the students able to learn and perform in an interactive environment. In such kind of environment students think, explore and learn. Hence, inclusion of self-interrogation strategy in their educational curriculum may help the students in gaining fruitful and more effective results in their game.

The primary aim of the present study was to find out the effect of the self-interrogation strategy in developing contemplative thinking and learning some basic skills in the basketball players, who were fifth-grade students by preparing educational units according to this strategy. Also, to find out the difference between the effects of the adopted approach and the self-interrogation strategy in developing reflective thinking and learning some basic skills in basketball players.

2. METHODS

2.1. Design

The present study was conducted on the students of Al-Wathba School for Boys, General Directorate of Education in Baghdad. The students belonged to second intermediate grade for the academic year 2018-2019. The present study was conducted within the time frame of June 2021 to September 2021.

The researcher used the experimental study design. In the present study, the participants were allocated into two groups i.e. the experimental group and the control group. The participants of the

experimental group received training by the self-interrogation strategy. The participants of the control group continued their studies in the traditional way (Figure 1).

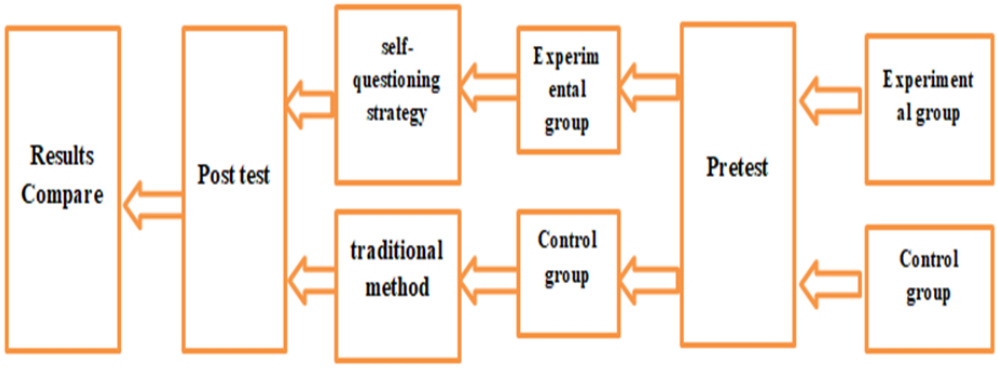

Figure 1. The study design scheme

2.2. Research community and sample

The research community was determined by the students of the intermediate stage (the second average) in the governorate of Baghdad / the General Directorate of Education of Karkh First Al-Wathba School for Boys. A total of 221 students were recruited for the present study using intentional method. Participants were divided into the group of 5. In each group, players were coded as A-B-C-D- E. from each group, students with the codes C and D were recruited. The player with the code C was recruited in the experimental group and the player with the code D was recruited in the Control group. A total of 82 participants were recruited with n=42 in each group.

2.3. Means, tools and equipment

In the present study, many tools and devices were used for the purpose of data collection with the aim to achieve the objectives of the research: official basketballs (25), duct tape (5 cm wide), video camera (Nikon d7100), photo camera (Nikon d7100), PC, a measuring tape, two manual stopwatches (Casio), one *Fox40Classic* whistle, CD Disks, Dell laptops (2), board and cones.

2.4. Field research procedures

2.4.1. Determining the skills used in the research

The basketball skills used in the research were determined according to the vocabulary of basketball prepared by the Ministry of Education for the second semester, and because the researcher conducted this research in the second semester of the year (2018-2019), so the basic skills were

determined (rebound handling - low tamping - scoring of stability) based on the sequence mentioned in the curriculum.

Reflective Thinking Scale: After successful review of many measures of reflective thinking, the Isaac and Wilson scale was used in the present study. This scale was Arabized by Barakat (2005), who reformulated it to suit the Iraqi environment. The scale included 20 paragraphs with the answers in the form of "Yes" or "No".

The paragraphs representing a positive trend for reflective thinking, included 1-2-3-5-6-7-8-9-10-13-14-15-16-17-18-19-20-22-23-27). One degree was given to the respondents on giving the answer "Yes" and "zero" on giving the answer "No". The ten paragraphs representing a negative reflective thinking included; 4-11-12-20-24-25-26-28-29-30. One score was given to the respondents on giving the answer "No" and "zero" on giving the answer "Yes". The total score for the scale ranged between 0 to 30 (Qalladah, 1986; Suleiman, 2000).

2.4.2. Determining the basic skills tests

After determining the basic skills used in the research (rebound handling, low dribbling, and stability scoring), the researcher prepared a questionnaire to determine the most appropriate test for each of the basic skills in the basketball. Test selection was based on extracting the overall percentages for each test. The tests that obtained an agreement rate of 70% or more were nominated, as shown in the Table 1.

Table 1. The percentages of experts' selection of basketball skill tests

Skill	Test	Viable	Percentage	Not viable	Percentage	Choice
Feedback handling	5meter rebound test with both hands	9	81.81%	2	18.18%	Chosen
	Technical performance appraisal	8	72.72%	3	27.27%	Chosen
The low dimple	Low dimple test (measurement of velocity)	4	36.3%	7	36.3%	Eliminated
	Low dimple test (level assessment)	9	81.8%	2	18.1%	Chosen

	Technical performance appraisal	3	27.2%	8	72.7%	Eliminated
Steady scoring	Steady scoring (measurement accuracy**)**	10	90.90%	1	9.90%	Chosen
	Scoring from stability (assessing performance from behind the free-throw line**)**	3	27.27%	8	72.72%	Eliminated
	Technical performance appraisal	9	81.8%	2	18.18%	Chosen

2.4.3. Skill tests

The feedback handling test with both hands (Al-Suwaidi, 2004). The test was initiated by asking the participant to stand firm on the ground. After hearing the start signal, the participant was asked to handle the ball from the chest level with both the hands towards the ground to the last third of the colleague standing at a distance of 5 m. Each participant was provided with two attempts. The best grade was calculated.

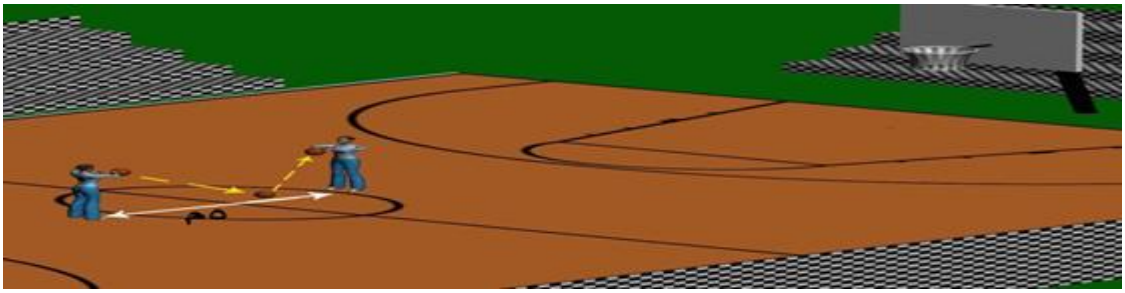

Figure 2. The feedback handling test

The low dimple test (Amayreh, 2000). Two parallel lines were drawn on both sides of the free-throw line and the distance between them was kept 3 meters. The participant began the dribble (the tataba) with one hand from the beginning of the line until he crossed the other line with the ball and feet together, then returned to the line he started from. Each participant was given two attempts and the best grade was calculated, knowing that the grade was from 10 and according to the expert evaluation.

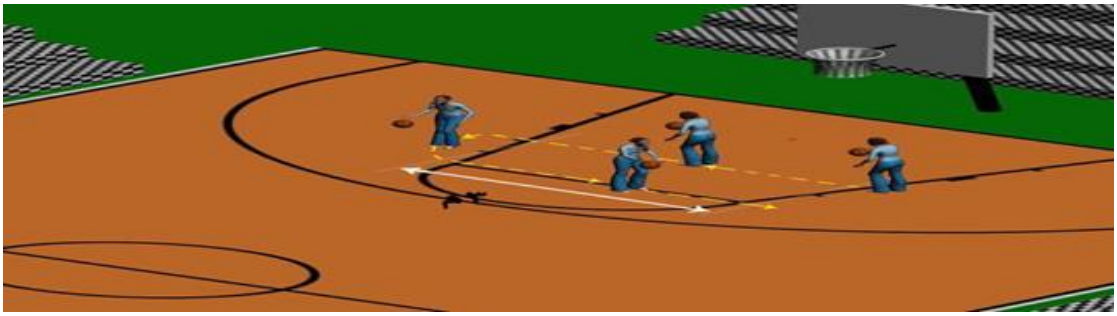

Figure 3. The low dimple test

Steady scoring test to measure steady scoring accuracy. The tester was asked to shoot the ball on the basket for three groups, each group of 5 consecutive shots from the middle of the free-throw field and on the sides. Two scores were calculated for each ball that entered the basket, and one score for each ball that touched the ring but could not enter. The total test scores, they are equal to the total points obtained in the fifteenth attempt, knowing that the maximum score was 30 degrees.

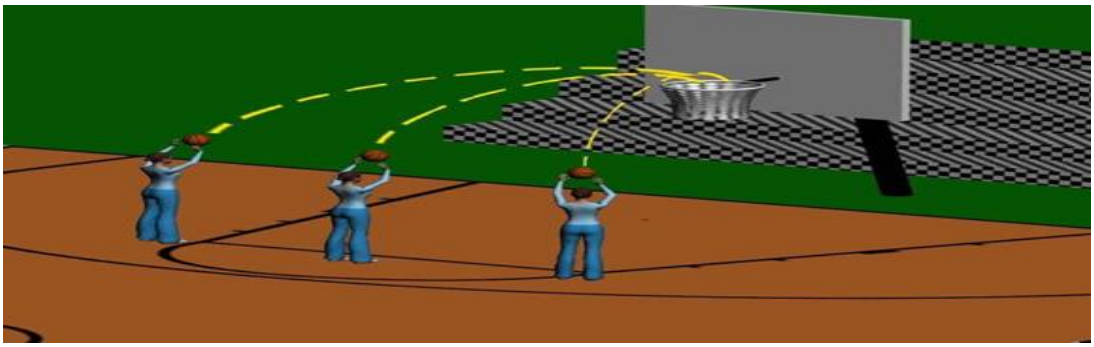

Figure 4. Steady scoring test.

2.4.4. Validity of the tests

The validity of a test is defined as "that the test measures what it was designed to measure", meaning that the honest test is a test that measures the function, that it claims to measure and does not measure anything else either in place of it or in addition to it" (Obaidan, 1988). The validity coefficient of the tests used in the research was found through the following.

The researcher used apparent honesty by presenting the candidate tests in the research to a group of experts in the field of tests and measurement in basketball. In light of obtaining the opinions of the experts, the researcher chose the tests that obtained the highest percentage of expert agreement.

The good test is characterized by its stability. The stable test "is the test which gives close results or the same results, when applied more than once under similar conditions" (Hammoudat &

Jassem, 1987). The accuracy of the test results is what should be measured. Therefore, the reliability coefficient of the tests used in the research was found through the test and retest method in the present study.

Test retest method was used by the researcher to find out the reliability coefficient. The reliability coefficient is calculated by "applying the test to one group of individuals twice in a row on two different days" (Lotfy, 1972). Accordingly, the researcher re-applied the tests of abilities and skills on the same 22 participants. The test was repeated after 7 days of the day of the first test. Pearson correlation coefficient was calculated. The results showed that the tests of abilities and skills were characterized by a high degree of stability.

A test is said to have objectivity when" the results of tests or measurements are not affected by subjective factors of the corrector". The approved tests are clear and understandable and far from self-evaluation and diligence of the assessor. The results are documented in the units of "time as second, degree as frequency, distance as cm." The instructions for each test were clearly defined and the conditions required during the application were established, in addition to the fact that the assistant work team was experienced and specialized in the physical education and sports sciences, and thus the approved tests were found to be of high objectivity as shown in the Table 2. The tabular t value was 0.632 under the significance level of 0.05 and the degree of freedom of 80.

Table 2. The values of the coefficients (reliability and objectivity) for the tested tests

S	**Test**	**Stability coefficient**	**Statistical significance**	**Objectivity coefficient**	**Statistical significance**
1	Rebound Handling Test	0.883	Substantial	0.901	Substantial
2	Low dimple test	0.882	Substantial	0.924	Substantial
3	Steady scoring test	0.837	Substantial	0.931	Substantial

2.4.5. Procedures

In order to conduct the primary experiment in an optimum way, two exploratory experiments were conducted by the researcher. A preliminary experimental study, is a study conducted by the researcher on the small sample prior to conducting the main experiment with the aim to select the research methods and tools relevant to the study (Hammoudat & Jassem, 1987).The preliminary experiment was conducted on 10 samples, randomly selected by lottery method from the second grade intermediate school stage of Al-Wathba School for Boys - Karkh II (section A).

a. The first exploratory experience of skill tests

The researcher conducted the exploratory experiment for the selected tests. The selected participants were provided with initial instructions regarding the skills with the aim to make them clear regarding the tests to be performed in the study. The validity of the skill tests was established for the skills i.e. rebound handling, low clapping and stability scoring

The exploratory experiment was carried out in the month of February 2021. to find out the validity of the skill tests used for the skills i.e. rebound handling, low dimple, and steady scoring. The preliminary experiment was conducted with the aim to verify the validity of the tools used in terms of positive assistance, to verify the fitness of the tests for the tester members and the ease of their application, to know the time required to conduct the tests, to verify the understanding and efficiency of the assistant work team in conducting measurements and tests and recording the results, to know the difficulties that the researcher may encounter during the course of the study and providing appropriate solutions to them.

b. The second exploratory experiment on the reflective thinking scale

The second exploratory experiment was conducted in the month of February 2021 with the aim to find out the scientific parameters of the scale and to know its suitability for the research participants. The second exploratory experiment was also conducted on the 10 samples selected from Al-Mansour High School. The scale forms were distributed to the sample participants. The participants were directed to return the forms after filling answering the paragraphs. The The second exploratory experiment was conducted to know the suitability of the scale to the level of the sample and the clarity of its paragraphs.

Main experience

1- Pre-tests

After successful application of two introductory units, on two successive days in the month of march, the researcher conducted tribal tests on the participants of the experimental group and control group in basketball skills tests and the reflective thinking scale. For two consecutive days, the sample of the research for the skills studied on the corresponding days.

2- Teaching units of the self-interrogation strategy

The researcher prepared educational units using the strategy of self-interrogation in developing reflective thinking in the game of basketball. The educational units were presented to the experts and specialists to show their suitability for the research sample (the experimental group). A total of 16 educational units were given to the participants, with two educational units per week. Each unit was given for 45 minutes, divided into 3 sections i.e. preparatory, main and final.

Before beginning the application of physical education lessons for the skills under the study, the researcher conducted two introductory teaching sessions for the students on the self-interrogation strategy including its pre-learning, during learning, and post-learning stages. The researcher started the main experiment by implementation of educational curriculum in Al-Mansour preparatory playgrounds for boys. The number of units regarding each skill has been separately distributed to the experts.

The four educational units were allocated for the backhand handling, four educational units for the skill of the low drum, two educational units for linking the previous skills of the bouncy backhand handling of the low drum, four educational units for the skill of scoring stability, and two educational units for linking skills. The previous one was a rebound thoracic manipulation with a low thrust. This division was done according to the opinion of experts and specialists, where the experimental group applied the strategy of self-rewarding, while the control group participants learned the skills using the method adopted by the teacher.

Four skill exercises, each lasting for 20 minutes, were given in each educational unit. The exercise duration included the time of the practical activity of the lesson, where the researcher provided the lesson plans, raising their level of difficulty gradually. During the last lessons, the level of difficulty of the exercises were increased by linking more than one skill in one exercise. As for the first experimental group, the skill to be learned is explained in light of the self-interrogation strategy,

and after its explanation and presentation by the teacher, the teacher asked the questions prepared by the researcher, related to the technique.

Each question was asked verbally, followed by which, participant was asked to answer giving it a proper thought for few seconds. Each participant took the answer. He was convinced by building a picture in his mind about the nature of the correct and required performance. After answering the questions, participants of the experimental began to implement the exercises prepared by the researcher for each of the skills under research. The participants of the control group followed the curriculum adopted by the teacher. The application of this method continued, under the supervision of the researcher. The whole exercise was conducted in the month of April 2018.

3- Post-tests of basketball skills and contemplative scale

After completing the main research experiment, final tests were accomplished by the researcher and his fellow teammates on two consecutive days in the month of April 2018. The researcher conducted the post-tests of basketball skills and the reflective thinking scale for the participants of control and experimental groups. All tests were conducted on the grounds of Al-Wathba School, Baghdad Governorate. The researcher followed the method of performing the same tribal tests, under the same environmental conditions.

2.5. Statistical analyses

In the present study, the statistical analysis was carried out using the Statistical Package for the Social Sciences (SPSS). The following analyses were conducted to obtain the results: arithmetic means, standard deviations and t tests.

3. RESULTS

After performing the steps for the implementation of the tests, the researcher was able to obtain the raw scores of the tests, and in order to know the significance of the differences and to ascertain the effect of the independent variable applied to the experimental group in the research sample, the results for the control and experimental groups were put into tables and graphs and then discussed for the purpose of reaching the achievement of objectives study and verify its hypotheses.

Table 3 presents the results of the pre and posttests in the experimental group. In the light of the extracted data for the participants of the experimental group, Table 3 shows the arithmetic mean and standard deviation and calculated t value for the reflective thinking scale (return handling, low pat, stability scoring) in the pre and post-tests of the experimental group. A significant difference was found between the pre and post-tests in favor of the post-test in the experimental group, with p value < 0.05 and the degree of freedom 40.

Table 3. Results of the pre and posttests in the experimental group

S	Variables	Measurement unit	Pre-test		Post-test		X Z	Y Z	T value	Indication
			X	Y	X	Y				
1	reflective thinking	Degree	20.22	0.22	22.27	1.33	1.2	0.23	16	Substantial
2	Rebound handling	Degree	2.78	0.986	4.85	0.869	1.89	1.272	9.644	Substantial
3	Low dimple pitch	Degree	1.76	0.710	2.82	0.607	1.02	0.979	6.661	Substantial
4	Steady scoring	Degree	2.02	1.162	5.16	1.578	3.13	2.830	7.145	Substantial

Table 4 presents the results of the pre and posttests in the control group. In the light of the extracted data for the participants of the control group, Table 4 shows the arithmetic mean and standard deviation and calculated t value for the reflective thinking scale (return handling, low pat, stability scoring) in the pre and post-tests of the control group. A significant difference was found between the pre and post-tests in favor of the post-test in the control group, with p value lower than 0.05 and degree of freedom 40.

Table 5 presents the results of the post-tests in the experimental and control groups. It is clear from Table 5 that the values of the arithmetic means, standard deviations, and the calculated t-value in the variables of the reflective thinking and skills scale (rebound handling, low thump, stability scoring), for the experimental and control groups, showed that there are significant differences between the dimensional tests in favor of the experimental group.

Table 4. Results of the pre and posttests in the control group

S	Variables	Measurement unit	Pre-test		Post-test		ZX	ZY	T Value	Indication
			X	Y	X	Y				
1	Reflective Thinking	60.4	4.13	55.2	70.4	15.25	2.4	2.23	20.44	Substantial
2	Rebound handling	Degree	2.87	0.834	3.72	0.912	0.86	1.124	5.025	Substantial
3	Low dimple	Degree	1.67	0.823	2.26	0.614	0.53	0.987	3.538	Substantial
4	Steady scoring	Degree	2.12	1.334	3.17	1.871	1.12	1.946	3.628	Substantial

Table 5. Results of the post-tests in the experimental and control groups

S	Variables	Measurement unit	Experimental group		Control group		X Z	Y Z	T Value	Indication
			X	Y	X	Y				
1	Reflective Thinking	Degree	22.27	10.33	70.4	15.25	20.25	20.29	20.49	Substantial
2	Rebound handling	Degree	4.85	0.869	3.72	0.912	0.89	1.145	5.030	Substantial
3	Low dimple	Degree	2.82	0.607	2.26	0.614	0.57	0.989	3.540	Substantial
4	Steady scoring	Degree	5.16	1.578	3.17	1.871	1,21	1.950	3.630	Substantial

4. DISCUSSION

A- Discussion of the results of the pre and posttests of the experimental group

By presenting and analyzing the results of table 3, which are related to the results of the experimental group in the pre and post tests and performance evaluation of the skills under study (rebound handling, low punch, stability scoring) in basketball, the results of the tests for these skills

were significant and in favor of the post tests, meaning that there are significant differences between the pre and post tests in favor of the post tests.

The researcher attributed this difference to the members of the experimental group to the use of the self-interrogation strategy. This strategy contributed to the development of reflective thinking and increased the learning of skills of the participants. It also helped in creating an educational environment in line with their abilities and aptitudes, exploration by asking questions for the purpose of increasing motivation, enthusiasm and diversity among students (Al-Amayrah 2002). "Putting the student in educational situations and providing an effective environment motivates them to achieve better performance (Attia, 2007).

In addition, the method of exploratory activities has an effective and positive role in urging them to learn and motivating them. "The adequacy of performance of player realty depend upon the strategy implemented for learning the skills of games in their educational curriculum. and their acquisition in educational situations (Allawi & Radwan 2000).

The content of the strategy included in the educational units, the method of explanation, clarification of the doubts and queries, the discussion on the various aspects and questioning and answering session collaboratively contributed to the formation of a dynamic perception of the skills. In a study conducted by Badran, Authors stated that, "The integration of technology with the strategy and the learning method enables the teacher to identify the individual differences between the students and give them appropriate exercises" (Khalifa& Al-Adawi, 2002), which increased and lead to the emergence of these positive results,

The researcher believed that the self-interrogation strategy used in this research provided the students freedom to think and apply these skills through the diversity and multiplicity of exercises and games that linked the skills from the technical and educational aspects. It also helped the participants in optimizing their performance by working on the feedback received by them immediately after the performance. This immediate positive reinforcement has contributed to increasing the students' motivation in a better way, which contributed to the formation of a cognitive outcome that helped answer the exploratory questions of skills because the real success of the student can only be achieved through the practice of activity and knowledge (Melhem, 2006).

B- Discussion of the results of the pre and posttests of the control group

As shown in the table 4, significant differences were found between the pre and post-tests, in the favor of post-tests in the research sample tests and performance evaluation tests. The method adopted by the subject school has had a positive impact on learning the skills of rebound handling, low dribbling, and scoring from stability in basketball,

The researcher attributed this difference to the educational curriculum and its containment of scientifically selected exercises with correct and consistent repetitions, in accordance to the level and ability of the participants. Practice is the most important variable in the learning process of skills (HS., & S. 2021). Mohamed Abdel-Ghani (1987) in their study stated that the progress of movement or skill is achieved through practice, repetition, and avoiding mistakes. This is done through the practical performance of the learner under the guidance of the teacher, and this in itself is one of the main steps used in teaching motor skills (Fatema & Sultana, 2020).

The researcher also attributed a remarkable appearance in the development of results and technical performance of the above skills in the control group. The reasons for these differences were the organizational structure of the educational units that the students were exposed to, which were characterized as having a clear goal, the students are required to achieve. This ensured the optimum learning in the skills reflected as better outcome in the game. Fouad Suleiman Colada stated that "the clarity and identification of goals in the light of certain behavior or performance levels are meaningful and effective" (Temsah & Safa, 2021)

5. CONCLUSIONS

Based on the findings of the present study, the researcher concluded that the educational approach used in the experimental group (the self-interrogation strategy) and the curriculum followed by the control group are effective methods in developing the specific basic skills in basketball. However, the students of the experimental group outperformed the students of the control group in the development of reflective thinking and the development of basketball basic skills. Therefore, the self-questioning strategy contributes to the development of reflective thinking, research and exploration of basketball skills in second-grade intermediate students.

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AUTHOR CONTRIBUTIONS

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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