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THE EFFICACY OF A PROPOSED STRATEGY BASED ON THE (MARQUQRD) MODEL, ONE OF THE KNOWLEDGE MANAGEMENT METHODS IN THE ALGEBRAIC THINKING SKILLS OF THE SECOND INTERMEDIATE GRADE STUDENTS

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Abstract

The aim of the research is to identify the effectiveness of using a proposed strategy according to the (Marquqrd) model in the algebraic thinking skills of second-grade intermediate students in the schools of the General Directorate of Education in Babylon.

To achieve the goal, the following null hypothesis was formulated:

There are no statistically significant differences at the significance level (0.05) between the mean scores of the students of the experimental group, which were taught using the proposed strategy according to the (Marquqrd) model, and the control group that studied in the usual way in the pre-post test of algebraic thinking skills.

The research community, which represents the middle and secondary schools for boys within the General Directorate of Education in Babylon, was identified, and the Yahya bin Zaid (p.) middle school was

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randomly selected, and the research sample consisted of (67) students from the second intermediate grade students, and two groups were chosen randomly, with (33) students for the experimental group, and (34) for the control group.

For the purpose of collecting data for the research, a test of algebraic thinking skills was built, as the test in its final form consisted of (24) items of the objective type, multiple-choice.

The appropriate statistical analyzes were carried out (difficulty coefficient, ease, discrimination coefficient and effectiveness of the alternatives), and the psychometric properties were ascertained.

After the statistical tools were chosen to analyze the results of the application of the test, such as using the associated analysis of variance (ANCOVA), the results indicated that: -

1- The students of the experimental group outperformed the students of the control group in the test of algebraic thinking skills.

2- The use of the proposed strategy according to the (Marquqrd) model led to an improvement in the algebraic thinking skills of the students of the experimental groups compared to the students of the control group.

Keywords: knowledge management, (Marquqrd model), algebraic thinking.

Research problem

Given the importance of algebraic thinking and its skills, it is considered one of the most important mathematical competencies that must be refined for all students as one of the skills of the twenty-first century, and one of the basic competencies, for mathematical enlightenment, and one of the basic mathematical skills that international TIMSS (1) exams focus on. To treat weakness and low levels of students, And their aversion to learning mathematics, and developing students' ability to think is one of the main functions of education at all levels of education. Mathematics occupies a central place among all sciences by using mathematics to solve problems in those sciences. Especially with regard to algebraic problems and how to deal with symbols and variables and translate drawings and shapes into algebraic equations to solve mathematical problems, and because the educational process is a complex process and its elements are intertwined in sequential and interrelated steps, and each step is affected by the step that precedes it and affects the next.Especially with regard to algebraic problems, how to deal with symbols and variables, and the translation of drawings and shapes into algebraic equations to solve mathematical problems. And because the educational process is a complex process and its elements are intertwined in sequential and interrelated steps, and each step is affected by the step that precedes it and affects the next. Therefore, there was a need for a more enjoyable and lively educational process, Given the importance of knowledge management models as a way to solve problems when used in the areas of management in some

institutions and organizations, including banks, educational institutions, companies and other institutions, This prompted the researchers to experiment with the use of a proposed strategy according to one of the knowledge management models, which is the (Marquqrdt) model, which may contribute to improving mathematics teaching and developing algebraic thinking. Therefore, it was necessary to use teaching strategies and models that contribute to better teaching and learning of mathematics.

As a result of the foregoing, the current research problem was developed in the second intermediate students' lack of algebraic thinking skills; so, the research problem is determined by addressing the following key question: -

What is the effectiveness of a proposed strategy according to (Marquqrdt) model in the algebraic thinking of second-grade intermediate students?

Research Importance

Additionally to the foregoing, the significance of the current research can be expressed in two ways, one theoretical and one practical:-

Theoretical importance:

1- Knowledge management is an organized process of searching for, selecting, organizing, and categorizing information in a way that increases the level of workers' understanding of it, as well as storing it in a way that improves the level of general intelligence.It gives the essential flexibility for work, protects knowledge from loss, and helps the process of utilising it in problem solving, decision making, and learning from the experiences it undergoes.

2- Directing the attention of those in charge of teaching and teaching mathematics in particular to the use of modern strategies and models in teaching that are concerned with algebraic thinking skills away from memorization and indoctrination.

3- This study is significant because it addresses a critical topic in mathematics, algebraic thinking, which is connected to worldwide mathematics standards, since the National Council of Teachers of Mathematics (NCTM, 2000) placed a high premium on it.

4- Recent trends in mathematics education programs emphasized the importance of developing algebraic thinking skills by employing modern teaching strategies in mathematics education**.**

Practical importance:

1- Proposing strategies according to knowledge management models and in line with modern trends, which emphasize the importance of employing ideas, opinions and innovation in the teaching process.
2- Providing a test of algebraic thinking skills for the second intermediate grade students.
3- Mathematics researchers benefit from teaching and learning mathematics through a conceptual framework about the variables of the study, including: suggested strategies according to knowledge management models, algebraic thinking skills, academic achievement in mathematics.

Third: Research

The research aims to identify the effectiveness of a proposed strategy according to the (Marquqrdt) model in the algebraic thinking skills of second-grade intermediate students.

Fourth: Research hypotheses

The following hypothesis was developed to answer the question of the research problem:
"There are no statistically significant differences at the significance level (0.05) between the mean scores of the students of the experimental group, which were taught using the proposed strategy according to the (Marquqrd) model, and the control group that studied in the usual way in the pre- and post-test of algebraic thinking skills.
$H_0: \bar{\mu}_1 = \bar{\mu}_2$
$H_1: \bar{\mu}_1 \neq \bar{\mu}_2$

Fifth: Research limits

The research is defined by all of the following:
• Students of the second intermediate grade in the intermediate day schools for boys affiliated to the General Directorate of Education in Babel.
• Mathematics book scheduled by the Iraqi Ministry of Education for the second intermediate grade, second edition, for the academic year (2022-2021).
• The first semester of the academic year (22-2021)

Sixth: Terms definition

1- Efficiency:

He defined it (Shehata and Al-Najjar, 2003) as: "The effect that the experimental treatment as an independent variable can have on one of the dependent variables" (Shehata and Al-Najjar, 2003: 230).

The researchers define it procedurally as: Using the proposed strategy according to the (Marquqrd) model in teaching the topics of the first four chapters of the first part of the mathematics course for the second intermediate grade,And measuring the change in the performance of second-grade intermediate students in algebraic thinking skills, and it is inferred from the difference between the mean scores of the experimental group and the control group in the post-test of algebraic thinking skills.

2- Strategy:

Defined by (Saada., 2018) as: "The educational concept that requires the development of a general teaching plan that combines the educational administration specialization and the specialization of curricula and teaching methods within it. From the educational administration comes the focus on the important decision-making process during the educational process inside or outside the classroom under the supervision of the school in it.As for the curricula and teaching methods, the procedures related to dealing withWith the study material that represents the content of the curriculum" (Saada, 2018: 49).

The researchers define it procedurally: a set of procedures, activities, and methods that the teacher chooses or plans to follow, one after the other, and in a sequential manner, using the available capabilities, to help students master the objectives of teaching.

3- Knowledge management: defined by:

(Al-Janabi, 2013) as: "An organized process of attracting, storing, disseminating, generating, and applying knowledge, in interconnected formats, to enhance learning and creativity, improve performance, and make decisions" (Al-Janabi, 2013: 66).

The researchers define it procedurally as a set of processes represented in (diagnosing knowledge, generating, storing and distributing it, and thus applying it), as these processes are used to teach second-grade students from the research sample,The researchers use a model of knowledge management, which is (**Marquqrdt**), which includes educational activities that focus on algebraic thinking skills and building and absorbing knowledge for the students of the experimental group..

4- Algebraic thinking:

(Dindyal, 2003) defined it as: "the student's ability to use symbols, algebraic relations, use multiple representation, use mathematical patterns and generalizations" (Dindyal, 2003: 14).

The researchers define it procedurally as: the ability of second-grade intermediate students to use symbols, algebraic relations, use multiple representation, as well as use mathematical patterns and generalizations to solve mathematical problems, analyze and interpret them, and it is measured by the degree that the student obtains in the test of algebraic thinking skills prepared by the researchers.

Theoretical Background

Knowledge management concept

(Trigg, 2000) states that knowledge management is a term used to describe the processes that bring learners and information technology together, to define knowledge acquisition, processing, storage, use and reuse, to develop understanding and create value (Trigg, 2000: 18)

Delong (2004) believes that knowledge management is a system of activities based on containing, compiling and formulating everything related to the critical and important activities of the educational institution with the aim of raising performance efficiency and ensuring the continuity of the institution's development in the face of the surrounding variables.

In other words, it is an institutional process aimed at coordinating and integrating data and information processing processes and technologies (Delong, 2004: 6), in addition to that knowledge management is a conscious organized effort directed by the teacher in order to capture, collect and classify,Organizing and storing all kinds of knowledge related to the educational institution's activity and making it ready for circulation and participation among learners in a way that raises the level of decision-making efficiency and organizational performance (Youssef, 2004: 7).

The emergence and development of knowledge management

The first to use the term knowledge management is DonMarchand since the beginning of the eighties of the last century, as the final stage of hypotheses related to the development of information systems, but he did not refer to it independently or as a separate work (Koening, 1999: 27).Then came the names of the first pioneers of knowledge management who are all credited with putting knowledge management on the map in some way, while different institutions and organizations were distinguished for their innovative work in the field of knowledge management.Japanese educational institutions also played an important role in the emergence of knowledge management and its applications (Abu Fara, 2004: 9-10).

(Bo Asha and Elia, 2012) adds that the knowledge management responsible for organizing and observing the production of intellectual capital, searching for it and achieving dialogue between learners, and that knowledge will be extracted through various meetings and participations, and creating an environment that allows dialogue and participation,Consequently, experiences are transferred from one learner to another. Knowledge is power, and this power can only be used in a positive social environment that combines trust, acquaintance, sincerity and interest. Thus, the relationship between intellectual capital, social capital, and knowledge management is a close and integrated relationship (Bo Asha and Elijah, 2012: 7).

From the foregoing, the researchers see that knowledge managementrefers to cooperation and partnership between learners and the exchange and dissemination of knowledge among them, and this comes through the mental processes of the learners, and what they possess of previous information related to a subject and using this information correctly and effectively to reach new knowledge.Thus, the required knowledge may reach all learners, and each learner is able to make the right decision and invent new information. Then the researchers reviewed a number of studies and research that dealt with knowledge management models, and they adopted one of these models, which is the (Marquqrdt) model, as follows:

Steps of the Marquqrdt Model (Marquqrdt, 2002)

Marquqrdt proposed a knowledge management model that consists of six stages that cover the process of transferring knowledge to the user through the following steps:

- Diagnosing knowledge: It aims to determine the knowledge of the learner, without which he cannot achieve the goal and does not preserve his knowledge with which he competes with his peers.Thus, it seeks to identify the knowledge that gives an added value to the learner to gain access to new knowledge.It is acquired by training and educating individuals, or through (the knowledge in their minds, or from similar previous experiences and practices, or by listening to lectures).

-Knowledge storage: Knowledge storage processes refer to the processes that include retention, maintenance, search, access and retrieval, and also refers to the importance of organizational memory, and knowledge is preserved through the exchange of experiences between individuals.

- Information analysis and use: It is meant to break down complex or compound information into small parts, specifying their names and types, establishing relationships between the parts, and making decisions related to other operations.

- Transfer and dissemination (expansion): Talking about the issue with as many ideas as possible and searching for full details.

-Knowledge application: This stage assumes the use and application of knowledge, as the entire knowledge must be applied to activities, and therefore all previous knowledge processes must be conducted. To achieve this, the teacher must make an effort to spread learning effectively, and the application of knowledge leads to learning processes That is, it comes through experimentation and application, which improves the level of knowledge and deepens it.

-Acquisition: focuses on organizing knowledge, linking it to other knowledge and enhancing it, which facilitates its retrieval, use and application in the future, as well as reorganizing declarative knowledge and transforming it into procedural knowledge to become meaningful and this is done through application and reflection (Marquqrdt, 2002: 26).

The researchers relied on this model in proposing a teaching strategy, which is the same steps above, in addition to two proposed steps, namely (installation), which represents the fourth step, as well as (inference) which represents the sixth step. The researchers explain the two added steps as follows:-

1) Composition:- Putting the elements or parts together in a new image to produce something innovative and unique. This skill is one of the divergent thinking skills that help the individual to discover and explore new ways of performing tasks or things. The installation skill provides the opportunity for invention and discovery of things.

2) Inference: It means the skill in extracting possible conclusions, and knowing what follows, through existing facts or logical premises, and is used to help determine what can be followed logically even if some data is not clear, prediction is an important step in the process of solving the problems.

The proposed strategy, according to the Marcus credit model, is represented by the following steps: **(Knowledge diagnosis, knowledge storage, information analysis and use, installation, transmission and dissemination (expansion), inference, knowledge application, acquisition)** respectively.

Algebraic Thinking

Battista and Brown (1998) see that algebraic thinking is important for students to use algebra in a meaningful way, and that teaching should focus on understanding rather than just exchange symbols.Throughout their mathematics studies, students should have opportunities to think and talk about general procedures for operations, numbers, and quantities, so that they do not eventually express the procedures using algebraic symbols and think about them (Batista and Brown, 1998: 5).

While Kaput & Blanton (2005) see that algebraic thinking plays a vital role in linking what the student studies and learns in the primary stage of arithmetic principles, and what he studies in the middle stage about relationships, functions, and the use of variables.In addition to continuing that link to what students learn in calculus in secondary school, algebraic thinking provides us with a strong foundation in building understanding around abstract mathematical thinking (Kaput & Blanton, 2005: 99).

(Al-Shehri, 2020) stated that algebraic thinking includes mental habits that build ways of thinking about the mathematical content in the field of algebra, especially in quantitative situations, which make the relationships between variables clear and specific, and in this context, algebraic thinking takes two paths,**The first** is the ability to think about unknown quantities in known ways, and **the second** is to build a meaning for symbols and operations using previous mathematical experiences in the field of arithmetic. He stressed the possibility of developing algebraic thinking by designing activities in mathematical representations, and activities that enhance students in recognizing and analyzing patterns, analyzing and representing relationships, building mathematical arguments and explanations, and using algorithms in correct ways (Al-Shahri, 2020: 274).

Algebraic thinking skills

Dindyal (2003: 183) studied the definitions of algebraic thinking and found that "it revolves around three main skills" as follows:

First: - The skill of using algebraic relations and symbols: It means the use of mathematical symbols and relations in a wide range in mathematics to express (units of measurement, constants, unknowns, generalizations of properties of numbers and translation of geometric shapes).

Second: - The skill of using multiple representations: It means the use of drawings, tables, and drawings that serve to facilitate gaining information and a deep understanding of the content of the material, and linking mathematics with life situations.

Third: - The skill of using patterns and generalizations: The modern curricula are clearly and largely concerned with mathematical patterns, and this was confirmed by the National Council of Teachers of Mathematics (NCTM, 2000) the great role that patterns play in developing algebraic thinking among students,Through research and studies, a variety of patterns emerged, such as: graphic patterns, geometric patterns, and numerical patterns.

Esseler and others (2014) pointed out to (Obaida, 2016) the importance of teaching algebra in the early stages, and the need to focus on developing algebraic thinking skills, developing algorithmic skills, and solving algebraic problems, especially verbal problems that support students in translation and mathematical representations (Obaida, 2016: 120).

After the researchers reviewed the Arab and foreign studies and research that dealt with algebraic thinking skills, it was found that the skills developed by (Dindyal, 2003: 183) are appropriate for the second intermediate grade stage of the research sample, so the researchers adopted them in constructing the test.And their opinion of algebraic thinking.

Second: Literature of Review

Previous studies include one aspect, which is studies that dealt with algebraic thinking skills, as for the independent variable (Marquqrdt) model, there are no previous studies in the field of teaching methods (according to the researchers' knowledge).

Research and studies that dealt with algebraic thinking skills, as shown in Table (1):

Table (1) *studies dealing with algebraic thinking skills*

Study country	Sample size	Study objective	Results
Hernon2005 America	Three Teachers	Knowing the nature of algebraic thinking and designing educational activities aimed at	The results indicated the effectiveness of the training program based on the use of the constructivist

	With Their Students	developing algebraic thinking among students in the first years of education	approach in developing teachers' beliefs about the importance of algebraic thinking
Study (Albahria) 2017 Amman	57students	Knowing the effect of teaching according to mathematical power on the achievement and algebraic thinking of the ninth grade students	The results indicated that there was a statistically significant difference between the mean scores of the experimental and control group students in the achievement test and the algebraic thinking test, in favor of the experimental group.
Al enizi 2020 Saudi Arabia	51 students	Recognizing the effect of activities based on procedural fluency in thinking and problem-solving ability among middle school students	The results showed that there was a statistically significant difference in algebraic thinking in all its skills and ability in algebraic problem, attributed to the method of teaching, and in favor of the experimental group.

Research procedures

First: Research Methodology:

The researchers chose the experimental method to achieve the objectives of this research, which is characterized by taking experimentation as a tool to test the validity of hypotheses, and its ability to control the various factors that can affect the behavior studied.

Second,Research Community

The research community consisted of students of the second intermediate grade in the middle day schools affiliated to the General Directorate of Education of Babylon Governorate for the academic year 2022-2021, as the total number of the community of students of the second intermediate grade reached (6921) students.

Third: Research Sample:

The sample size for the current research was (76) students, (33) for the experimental group and (34) students for the control group from Yahya Bin Zaid Intermediate School.

Fourth: Research Tools:

One of the research requirements is to prepare a tool that measures the dependent variable, which is (the test of algebraic thinking skills), in order to know the achievement of the research objectives and hypotheses, as the researchers built the tool according to the following steps:-

1) The theoretical concept of algebraic thinking was defined, and the researchers relied on Dindyal (2003) classification of algebraic thinking skills, which will be adopted in the construction of the test items.

2) The algebraic thinking skills were presented to a group of arbitrators specializing in mathematics teaching methods for their validity and suitability to the research sample and to ascertain the indicators for each skill, and after reviewing the opinions and observations, they were approved by more than (80%) of the arbitrators.

3) The test was prepared and it consisted in its initial form of (26) items of the objective type, as these items measure the three skills of algebraic thinking that were identified previously.

1)The researchers prepared special instructions for testing algebraic thinking skills, and they took into account clarity and indicated that the results obtained are in order to complete the requirements of the research and have nothing to do with other purposes.The members of the research sample were asked to answer all the test paragraphs and not to leave any paragraph without an answer, and a small circle is placed around the letter that represents the correct answer.

2)The researchers presented the paragraphs of the algebraic thinking skills test consisting of (26) items of the objective type (multiple choice), to a group of arbitrators and specialists in mathematics and its teaching methods, to express their opinions and observations about the validity of these paragraphs, and its paragraphs were approved by more than (80%) of the opinions of the arbitrators. And the test is ready in its initial form.

3) To identify the clarity and understanding of the paragraphs of the test of algebraic thinking skills by the exploratory application sample, in addition to the clarity of the instructions for answering it, and calculating the time it takes for the student to answer,The test was applied to a sample of (100) students of the second intermediate grade, as the students were asked to read the instructions first and then pay attention to the test paragraphs and inquire about any ambiguity, and it was found that the instructions were clear and all the paragraphs were understandable to all students, and the time taken to answer was calculated It was (75) minutes.

4)Exemplary answer keys were set for the test paragraphs, and one grade was given for the correct answer, zero for the wrong answer, and the answers left or indicated for more than one answer were considered a wrong answer, and the range of scores ranged between (0-26) degrees, and the overall degree for the test became (26(Degrees

5) Statistical analyzes were conducted for the test items and the coefficients of difficulty, simplicity, discrimination and effectiveness of the alternatives were calculated, after the test was applied to an

exploratory sample, and all items were acceptable except for the third paragraph whose difficulty was (0.83) and the eighth paragraph had a difficulty of (0.81), so it was deleted.

Validity Test

The researchers presented the paragraphs of testing algebraic thinking skills to a number of arbitrators in mathematics and its teaching methods, and through their observations and opinions, and making sure that the test items measured the skills that were previously identified, the phrasing of some of the paragraphs was modified, and then the test became apparently honest.

Test Stability

The Kewder-Richardson equation -20 was adopted to extract the reliability coefficient to measure the internal homogeneity of the test items, and the method also depends on calculating the correlations between the item scores.The reliability coefficient of the test was (0.79), meaning that the test had a good percentage of stability, and the test became composed of (24) items in its final form.

Fifth: The final application of the experiment to the research sample

For the purpose of answering the research questions and verifying its hypotheses, and after conducting the statistical analyzes of the test

For the purpose of answering the research questions and verifying its hypotheses, and after conducting the statistical analyzes of the test with its (24) paragraphs, the post-test of the algebraic thinking skills was applied on Wednesday (19/1/2022), after informing the students before the test of a sufficient period to prepare properly.

Sixth: Statistical means of interpreting the results

The appropriate statistical methods were used for the research, including arithmetic mean, standard deviation, analysis of variance test, Kewder's equation -20 and Pearson's correlation coefficient, as well as the coefficients of difficulty, ease, discrimination coefficient, and the effectiveness of alternatives for the objective paragraphs.

First: Presentation and interpretation of the results

In order to find out the results related to the effectiveness of the proposed strategy according to the (Marquqrd) model in the algebraic thinking skills of second-grade intermediate students, the following null hypothesis was tested:

Null Hypothesis:

"There are no statistically significant differences at the significance level (0.05) between the mean scores of the students of the experimental group, which were taught using the proposed strategy according to the (Marquqrd) model, and the control group that was taught in the usual way in the pre- and post-test for algebraic thinking skills.

In order to find out whether the difference between the mean of the experimental group and the control group on the pre- and post-test of algebraic thinking skills was statistically significant at the significance level (0.05), and in order to isolate the proportion of the extraneous variable of the pre-test for algebraic thinking skills statistically, the accompanying or joint analysis of variance (ANCOVA) was used.Which makes the results more accurate by modifying the data in light of the differences that exist between the students' scores before the start of the experiment, and in order to identify the statistically significant differences between the average scores of the students of the experimental group who studied according to the proposed strategy according to the (Marquqrd model),And the students of the control group who studied in the usual way in the pre and post test of algebraic thinking skills, as shown in Table (2):-

Table (2): *The results of the (ANCOVA) test for the scores of students of the first experimental group and the control group in the test of algebraic thinking skills*

Variable	**ANCOVA**	**Degree of freedom**	**Least squares sum**	**Average least square**	**(F) value**	**Statistical significance**
Algebraic Thinking Skills	Between The Groups	1	819.132	819.132	445.916	**Significant**
	Within The Groups	64	117.566	1.837		

It is clear from the above table that the calculated "F" value (445,916), which is greater than the tabular "P" value (3.99) at the level of significance (0.05) and with a degree of freedom (65), and because the calculated is higher than the tabular, then there are statistically significant differences,And after isolating the extraneous variables from the pre-test on the students' performance in the post-test, the modified arithmetic averages were extracted, and to determine the direction of the difference and in favor of any group we use Scheffe's test to find out the direction of the differences between the adjusted averages as in Table (2).

Table (2) *Scheffe test results for the scores of the first experimental group and the control group in the test of algebraic thinking skills*

Dependent Variable	**The Group**	**Number**	**Average Arithmetic Mean**	**Calculated)F(Value**	**(F)Table Value**	**Statistical Significance At The**

						Significance Level 0.05
Algebraic thinking skills	Experimental	33	[a]19.901	447.966	3.99	**Significant**
	control	34	[a]12.891			

a: Pretest percentage as an extrinsic variable = 6.4179

It is clear from the above table that the arithmetic average of the scores of the first experimental group (19.901) is higher than the arithmetic mean of the scores of the control group (12.897), meaning that the real performance of the first experimental group is better than the real performance of the control group in the test of algebraic thinking skills**.**Since the computed adjusted value of (447.966) is higher than the tabular value of (3.99), so we reject the null hypothesis and accept the alternative hypothesis, meaning that there are statistically significant differences (0.05) between the scores of the first experimental and control groups and in favor of the experimental group.

In order to verify the effectiveness of using the proposed strategy according to the (**Marquqrd)** model in the algebraic thinking skills of the experimental group, the modified Black gain ratio equation was calculated to find the value of the gain between the mean of the pre-test (6.33) and the post-test (19.88), as the gain equation reached (1.31) This means that the proposed strategy is highly effective in comparison with the acceptable limit of effectiveness, which is (1.2) set by Black.

Second: Conclusions

1-There is an effectiveness of the proposed strategy in raising the algebraic thinking skills of the students of the experimental group in mathematics compared to the students of the control group who were taught in the usual way.

2-The proposed strategy made the learner the focus of the educational process, paying attention to his activities and mental abilities, and this is what modern education focused on.

3-Emphasis on the work of groups during teaching because of its great importance in diagnosing knowledge, building it and using it to reach new knowledge, as well as making the student accept the opinions of others and exchange and disseminate information among them.

Third: Recommendations

In light of the results of the study, the following was recommended:

1- Teaching mathematics to the second intermediate grade and other stages using the proposed strategy in the current research, due to its great role in achievement and algebraic thinking skills in mathematics.

2- Conducting training courses to train teachers on how to prepare and implement the activities of the proposed strategies, and to clarify their effective role in developing mathematical skills, including algebraic thinking skills.

3- Preparing a guide for the teacher based on developing algebraic thinking skills, as well as how to follow the proposed strategy in the current research.

Fourth: Propositions

In the current research, we suggest conducting the following future studies:

1- Studying the effectiveness of the proposed strategy according to the (Marquqrd) model in different study stages.

2- Studying the development of algebraic thinking among different academic stages and other categories of students, and making comparisons between them.

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