

The effect of using the search strategy for the other half on the acquisition of concepts in mathematics among fifth-grade students

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ABSTRACT

The goal of the research is to identify the effect of using the search strategy for the other half on the acquisition of concepts in mathematics for fifth grade students. The experiment was applied to a sample of (60) male and female students, the experimental group (30) male and female students, and the control group (30) male and female students. Fifth grade primary school in (Al-Shumous Elementary Mixed School) for the academic year (2020-2021) AD, the two groups covered the variables (intelligence, previous knowledge, chronological age calculated in months, previous achievement in mathematics, academic achievement for the parents), and the research tools represented were built In the (acquisition of mathematical concepts test), as it was composed of (21) objective paragraphs, and the difficulty factor, discrimination and effectiveness of the wrong alternatives to the test items were verified, and after the end of the experiment, the mathematical concepts acquisition test was applied, and the results of the research showed the presence of a statistically significant difference at a significant level (0.05) between the mean scores of the experimental group students and those of the control group students in the test of acquiring mathematical concepts as a whole, in favor of the experimental group.

Article Received: 10 August 2020, Revised: 25 October 2020, Accepted: 18 November 2020

RESEARCH PROBLEM:

(Dandash, 2003) pointed out that there is a problem in teaching concepts as teaching based on narration and recitation and not giving various exercises and giving one experience and the teacher's insistence to reach the end of each lesson and give facts, information and many unconnected concepts that make it difficult for students to learn basic concepts And acquired. (Dandash, 2003: 75-76)

The opinions of a number of mathematics teachers for the fifth grade of primary school / during their opinion polls in a number of primary schools were taken by directing a closed questionnaire that included 6 paragraphs, where the first paragraph indicated that 80% of them are still using the usual method of teaching, while the paragraph indicated The second, 93% of them provide information without taking into account individual differences, while the third paragraph indicated that 30% of them do not encourage students to discover solutions on their own, and the fourth paragraph also clarified that 75% of them do not study mathematics in an integrated and coherent manner, and it is interesting that the fifth paragraph has indicated 80% of them do not know the modern teaching strategies that adopt the learner as the center of the educational process, and the sixth paragraph of the questionnaire indicated that 90% of them do not use the methods that fit the

developed curriculum currently applied in Iraqi schools.

Based on the above, the idea of applying the strategy of searching for the other half came from one of the Kagan Cooperative Learning Structures as a proposed solution to the problem of acquiring mathematical concepts and within the limits of the researchers' knowledge, no previous studies have been conducted that used this modern strategy in Iraq and will be applied first Once in elementary school.

Thus, the search problem can be identified by answering the following question: **-What is the effect of using the search strategy for the other half on the acquisition of concepts in mathematics among fifth-grade primary students?**

Research importance:

Perhaps what distinguishes modern mathematics is that it is not just separate routine operations but rather an integrated cognitive structure with each other, where the mathematical concept is the basic component of the rest of the mathematical structure components of principles, generalizations and skills, so the principles and generalizations are written in the form of a phrase expressing a relationship between two mathematical concepts Or more, just as skills are nothing but an application of

mathematical concepts, hence the major task of mathematical concepts in the process of teaching mathematics.

(Abu Zeina, 2010: 122)

The formation of mathematical concepts and their acquisition by the learners requires an appropriate teaching method that ensures the safety of their learning, retention and retention of them. If they are not properly and solidly formed, the information acquired in the later stages of education remains confused because it loses the solid ground on which it is based.

(El-Sherbiny and Sadik, 2000: 49)

From the researchers' review of teaching methods and strategies that can meet the ambition of conferences, seminars, and modern directives in teaching methods, it was noted that there are many teaching strategies that can be followed in the classroom during teaching according to the basic pillars of constructivism theory, which confirms the active and effective role of the learner during learning and in light of that, I was chosen The search for the other half of cooperative learning is one of the Kagan structures, which is an unusual method of teaching.

Kagan (2013) believes that these structures are simple educational strategies that regulate the interaction of learners with each other, the curriculum and the teacher, and improve academic achievement and retention, and the development of various educational skills, which are suitable for all educational levels.

(Kagan, 2013: 4-6)

Kagan's ingenuity is that he was able to create structures compatible with all content, due to its diversity and the diversity of its fields of use, so it is suitable for any class activity.

This study derives its importance from the importance of the target group in it, as the primary stage is the basis for all other stages of education and the years that the learner spends at this stage of the important years in his psychological, physical and mental formation due to the importance of this period, which plays an important role in the formation of his personality, trends and tendencies, and it enjoys attention Adult in various settings in order to prepare learners and equip them with socially acceptable habits and skills.

(Al-Khalili et al., 1996: 169)

The importance of the current research is evident:

1. This research is considered one of the advanced local research that dealt with the search strategy for

the other half in the acquisition of mathematical concepts as far as the researchers' knowledge.

2. It represents a new addition to Iraqi and Arab research on the subject of using the search for the other half strategy.

3. It provides a theoretical framework about Kagan strategies in cooperative learning.

4. It may help researchers in the field of curricula and methods of teaching mathematics to benefit from it and apply it to various disciplines.

5. May help primary school teachers to try to draw students' attention towards a love of learning mathematics and increase the acquisition and retention of information.

6. This research may contribute to directing teachers to the importance of Kagan strategies as one of the methods of cooperative learning and its application in teaching developed mathematics for the elementary stage.

Research Objective:

The current research aims to identify the effect of using the search strategy for the other half on the acquisition of mathematical concepts among fifth-grade primary students in mathematics.

Research Hypothesis:

For the purpose of verifying the goal of the research, the researchers put the following null hypothesis:

There is no statistically significant difference at the level of significance (0.05) between the average scores of students who studied according to the research strategy for the other half and the average scores of students who studied according to the usual method of teaching in the concept acquisition test, from which three sub-hypotheses are derived:

1. There is no statistically significant difference at the level of significance (0.05) between the average grades of the fifth grade primary students who studied using the search for the other half strategy and the average scores of the students who studied using the search strategy for the other half in the concept acquisition test.

2. There is no statistically significant difference at the level of significance (0.05) between the average grades of the fifth grade primary students who studied using the search for the other half strategy and the average scores of the students who studied in the usual way in the conceptual acquisition test.

3. There is no statistically significant difference at the level of significance (0.05) between the average grades of the fifth grade primary students who study using the search for the other half strategy,

the average scores of the students who study in the usual way in the conceptual acquisition test.

Limits Research:

The current research is limited to:

1. Human borders: Fifth grade primary students in elementary schools affiliated to the General Directorate of Education in Baghdad, Rusafa / 2 for the academic year (2020-2021).
2. Spatial boundaries: Baghdad governorate / Al-Rusafa (Al-Shumoos Primary Mixed School) affiliated to the General Directorate of Education in Baghdad, Rusafa / 2.
3. Scientific boundaries: The three chapters of the topics (large numbers, large numbers addition and subtraction, multiplication of numbers) of the mathematics book scheduled for fifth grade students for the primary school year (2020-2021), first edition, 2019.
4. Temporal limits: The first semester of the academic year (2020-2021).

Definition Of Terms:

- **The effect**

(Al-Laqani and Ali, 1996) defined it as: All that remains with the learner from what he has previously learned in educational situations or what he has gone through from the experiences of a nanny and is not exposed to the factors of dispersion and forgetfulness. (Laqani & Ali, 1996: 75)

Procedural definition: It is the change that appears through the results of the mathematical concepts acquisition test after applying the search strategy for the other half to the fifth grade pupils of primary school in teaching the three classes (large numbers - adding and subtracting large numbers - multiplying numbers).

- **Research strategy for the last half**

Both (Eriq, 2009) and (Ashour, 2019) knew it: that it is a combination of Kagan structures in which a group of cards (one part contains questions and the other part includes answers) is distributed among the students and they are asked to search the other half of the card and whoever finds The supplementary card stands in the corner of the row again until the time allotted for the activity ends. (Eiq, 2009: 13) (Al-Ashour, 2019: 22)

And he defined it (Embu Saidi and others, 2019): It is one of the effective

teaching strategies whose idea is based on this strategy on the condition that the student who carries a specific question searches for the answer to that question in another student.

(Embu Saidi et al., 2019: 388)

Procedural definition: It is a modern method of cooperative learning methods based on organized activity in the classroom, which provides greater opportunity for fifth grade students to learn joint and positive, and works to increase the role of the student, as cards are made that include the lesson content, each information is divided into two parts, each written Part of a card, and the cards are distributed randomly, and the student begins to search for the other half of the information because he has the first half of it, and when the student finds the information that completes his information when another student holds his hand and stands aside, expressing the completion of the task.

- **athematical Concept :**

He defined it (Al-Sharif, 1996) as: "It is an abstract mental image formed in the learner as a result of generalizing common properties and attributes among concept examples such as: the concept of number, group, and geometric shapes." (Al-Sharif, 1996: 95)

Procedural definition: a group of topics, symbols, elements or events mentioned in the chapters (large numbers - adding and subtracting large numbers - multiplying numbers) of the mathematics book scheduled for fifth grade students that combine common distinct characteristics so that each part of them can give the same name ".

- **Acquisition of Concept:**

Defined (Davise, 1977) as: "The ability of the learner to distinguish between examples that belong to the concept and examples that do not belong to it, and to define the characteristics and conditions sufficient for any example to be an example of that concept."

(Davise, 1977: 13)

Procedural definition: It is the ability of fifth-grade primary students to define and distinguish concept examples from not concept examples and apply the

mathematical concepts contained in the first three chapters of the fifth-grade mathematics textbook, measured by the degree obtained by students in the mathematical concepts acquisition test at its three levels (definition, distinction, Application) intended for this purpose.

Theoretical background

First: - Search strategy for the other half

The search strategy for the other half of the important cooperative learning strategies in every lesson: its idea is to connect two related or different things such as (picture and word and its meaning, question and answer, problem and its solution, letter and movement, and many other things).

This strategy creates a fun and dynamic atmosphere in the classroom, where students stand in a circle in the classroom, and the teacher distributes cards

To organize this strategy appropriately, it is advised to:

- Choose the appropriate course material.
- Prepare the cards well.

Exit of learners with healthy answers.

- The presence of sufficient space to allow the application of this formula.

(Abdel Moneim, 2014, 170),(NCED, 2014,33)

From the above, we can conclude that this strategy does not target the search for the winning group, as much as you intend to access ideas and knowledge of cognitive solutions and access them in the form of cooperative education, while adding an atmosphere of fun and fun to learning, which reduces the feeling of boredom and monotony in learning, and the strategy is one of the strategies. Kagan in developing and modifying cooperative education and assistance, in building communication skills, proper socialization, and classroom building ability.

It is known that cooperative learning in general works to divide the classroom into groups, and each group is entrusted with clear educational tasks that activate the role of the learner, and go outside the scope of traditional education circles, and the learner's role in it is limited to hearing and indoctrination of the scientific material.

The impact of the search strategy for the other half

1. This strategy helps support interaction and cooperation between learners.
 2. Encourages peer learning.
 3. Accepting other people's options.
 4. Self-evaluation of the individual (the learner).
 5. Accustom the individual (the learner) to the daring in decision-making.
- (NCED, 2014,33)

Steps to find the other half strategy:

1. The teacher distributes to the team members cards with questions written on it, and other cards with answers. These questions are distributed randomly, so that each individual (learner) takes one card that includes a question or an answer to the question.
 2. Through a move signal and then prove, each individual (educated) searches for the answer to the question in his hands from another (educated) individual carrying the answer to this question.
 3. The individual (the learner) who gets the answer and the individual (the learner) who provides the answer withdraw from the composition, while the others continue, until the time of the composition ends.
 4. Repeat the second and third steps.
 5. The teacher presents and reviews the healthy answers so that everyone knows the questions and the answers to them.
- (Ambosaid et al., 2019: 388)

As for (Abdel Moneim, 2014), he indicated the following steps:

1. Distribute cards.
 2. Find the other half of the card.
 3. Review the correct answers.
 4. Exchange cards randomly.
 5. Repeat the second and third steps.
- (Abdel Moneim, 2014, 170)

Other half strategy goals :

(Abdel-Moneim, 2014) explained the most important objectives of the search for the other half as follows:

- It increases the interaction between the learners when using any movement and intellectual activity.
- Make the individual (the learner) interact and cooperate with other learners.
- Helping learners to be able to compare things, and let each individual (learner) accept the other opinion without criticism or evaluation.
- It creates a dynamic atmosphere inside the classroom, where learners stand in a circle in the classroom, then the teacher distributes a group of cards to them, part

of which includes questions and the other part includes answers to them, and he asks his colleagues to search for the other half of the card, and whoever finds the card The complement stands in a corner of the class again until the time allotted for the activity ends.

- Learners learn how to make decisions on their own, without the need for a teacher, and this is one of the best features of this strategy.

(Abdel Moneim, 2014: 170)

Kagan Strategies in Cooperative Learning and Teaching

Mathematics:

Mathematics is one of the difficult disciplines that require new teaching methods, so the use of Kagan strategies in cooperative learning to teach mathematics helped reduce the effort and effort that the teacher exerts during the teaching process. Preparing working papers and special tests.

(Al-Omari, 2015: 41)

(Al-Awadi, 2019) stated that cooperative learning on the basis of Keegan structures is a framework for building content to suit all subjects, including mathematics, and these structures make the learner more able to think, making mathematics more flexible and enjoyable and makes the teacher more confident when teaching mathematics. (Al-Awadi, 2019: 21)

Kushnir (2001) describes Keegan strategies as simply the way in which you organize any activity, and are designed to help achieve various educational goals. Quoted from (Al-Mohammadi, 2018: 202)

It can be noted here that this strategy can be reflected in the learners' learning and their acquisition of mathematics concepts through mastering the content of the lesson, developing thinking skills to a better level, and helping to find solutions to many problems that face the teacher when teaching mathematics, and developing knowledge acquisition among learners. It gives learners the freedom to express their thoughts and opinions and to keep mathematics and its basic concepts for as long as possible.

Second, Mathematics Concepts:

Mathematical concepts are of great importance when teaching and learning mathematics, not only because they are the strings that make up the mathematical fabric, but rather they provide the

learner with a means by which he can keep pace with the cognitive growth in mathematics, as they are on a degree of flexibility that allows the assimilation of new facts, which are organized into their composition without being Vibrates the cognitive organization of the learner.

(Al-Mashhadani, 2011: 9)

The concept is the structural unit of mathematics, and each concept has a specific meaning associated with it, so the concept is an abstract idea that refers to something that has an image in the mind, and this abstract idea may be given a name indicating it. Examples of the concept are: number 5, triangle, ruler, cube. (Al-Huwaidi, 2010: 24)

Types of Mathematics Concepts

1. According to her affiliation to her chain of reference

A- Singular concepts: are the concepts whose attribution group is a unitary group, such as the concept of number 7, approximate ratio, point of origin.

B- General concepts: are the concepts that each of them contain more than one element, such as the concept of a natural number, a negative number, a complex number, and a quadratic conjunction.

(Abu Zina, 225: 2010)

2. Johnson and Rising's Classification

A- Concepts related to groups: These are the concepts that we obtain by generalizing the properties of the elements of the concept space. An example is the rectangle concept, whose space consists of several geometric shapes that share the following properties (each of them is in a quadrilateral in which every two opposite sides are equal and parallel All its corners are menus)

B- Concepts related to working methods: These are the concepts that you obtain as a result of taking certain steps of work, for example (multiplying vectors)

C- Concepts related to relationships: These are those concepts that focus on comparison and linking processes between group elements, such as concepts (\geq , \neq).

D- Concepts related to mathematical structure: These are those concepts related to mathematical structure, such as (the concept of closure).

(Al-Sharif, 32: 1996-33)

Third, the acquisition of concepts (Acquire Concept):

Al-Khatib (2011) believes that the task of concept acquisition is an essential part of the teaching process, as teachers continuously teach

new and varied concepts to learners in ways and methods between them, so that the difference may occur with the same teacher in presenting two different concepts for one class. (Al-Khatib, 2011: 189)

The acquisition of concepts helps to retain the information, benefit from it and apply it in different situations, if it is organized in the form of specific categories, and the concept acquisition depends on a set of factors, including the learner's cognitive status, and this means the extent of the learner's knowledge of the previous required concepts, which are basically necessary to acquire new concepts. The ability of the learner to learn a new concept is affected by the extent of his understanding of the concepts he learned in the past, and it has a relationship with the new concept. Janet and Berliner indicated that the acquisition of the concept is what makes learning possible.

(Al-Titi, 2001: 14)

Inference acquisition of concepts:

The most important modern approach to the development of learning is measurement, as through it the achievement of the learning objectives is identified and the strengths and weaknesses are identified, and since the measure of the acquisition of mathematical concepts is like any other aspect of the learning process, the acquisition of mathematical concepts can be measured through oral and written tests in their forms. Miscellaneous.

(Al-Titi, 2004: 140)

As for Saadeh, it indicates that the concept is acquired when the learner is able to:

1. It gives a name to the concept.
2. Be able to define the concept and define its characteristics.
3. Can distinguish a concept through its characteristics that distinguish it from other concepts.
4. Finding the difference between examples and non-examples through its specific characteristics.

(Saadeh, 1988: 389) and (Mari and Al-Heila, 2005: 215)

Regardless of the method of measurement, **both (Ashour and Al-Hawamdeh, 2007)** see that learning the concept and its acquisition can be judged by the learners by fulfilling the conditions for their performance:

1. They verbally express the concept.
2. They distinguish between positive and negative examples.

3. Adopting the concept that they have learned, and this is called "Impact Learning".

4. They understand the hierarchical relationships between concepts.

(Ashour and Al-Hawamdeh, 2007: 294)

By reviewing the views of many educators who dealt with the acquisition of concepts in general and the acquisition of mathematical concepts in particular, they almost agree in their content on the overall movements of the acquisition of the mathematical concept. The opinion of Brunner and Al-Ma'ouf will be adopted to ensure that mathematical concepts are acquired by the learners of the study sample and build the test items for the acquisition of mathematical concepts Which :-

1. Definition of the concept.
2. Distinguish the concept.
3. Application of the concept.

That is, for each concept, the learner must give three signals in order to ensure his acquisition of that concept and its incorporation into his cognitive structure. (Al-Mayouf, 2009: 249)

Previous studies:

- **Study (Hussein, 2014)**

This study was conducted in Iraq. It aimed to identify the effect of the reciprocal teaching strategy on acquiring mathematical concepts and the attitudes of female teacher education institutes towards mathematics. The researcher used the experimental approach. The research sample consisted of (72) female students of the third grade, institutes for teacher preparation distributed into two groups. Experimental: they studied according to the strategy of reciprocal teaching, a control who studied according to the usual method of teaching, the research tool: a concept acquisition test. A test was prepared to measure the acquisition of mathematical concepts according to the Brunner Classification of Acquisition (knowledge, distinction, application) by four alternatives and a measure of trends towards mathematics, Statistical means: T-test. The results indicated the superiority of female students of the experimental group over female students of the control group after a comparison between the mean scores of the students of the two groups in the acquisition test.

- **A study (Dweik, 2018)**

This study was conducted in Palestine. This study aimed to find out the effect of the search strategy for the other half on the acquisition of scientific concepts and critical thinking among the basic sixth-grade students in the subject of science and life. The researcher used the semi-experimental approach and the research sample consisted of

(126) male and female students from the class. The basic sixth, where they were divided randomly into four groups: two experimental subjects studied using the search strategy for the other half, two control subjects studied in the usual way of teaching, research tools: a test for scientific concepts, a test of critical thinking, and their validity and reliability were verified by analyzing the data then The use of averages and standard deviations, a teacher's guide for training using the search for the other half strategy, and one of the statistical methods used is the one-way analysis of variance test. The related results showed that there are differences between the average students' performance in testing scientific concepts and testing critical thinking skills of sixth grade students in science and life due to the teaching method and gender and in favor of the search strategy for the other half and females. Based on the results of this study, the researcher recommended organizing training courses for supervisors and teachers. And science teachers to use the strategy of searching for the other half for its positive role in increasing achievement and developing scientific concepts.

- **Study (Al-Azzam, 2019 AD)**

This study was conducted in Saudi Arabia. This study aimed to identify the effect of using Keegan structures on the achievement of second-grade intermediate students in the Social and National Studies course, where the researcher followed the semi-experimental approach and the research sample consisted of (60) students from the second intermediate grade. Divide them into two groups: the experimental was studied using the search strategy for the other half, the control studied in the usual way in teaching, the research tool: a post-achievement test was used, and the most important results of the study resulted in the presence of statistically significant differences at the level of significance (0.05) between the average scores of the students (The experimental and control group) in the post-test for the benefit of the experimental group is attributed to the use of Keegan structures, and the researcher suggested training social studies teachers to use (Keegan) strategies in cooperative learning, training students to use the strategies of Keegan structures in the social classes in order to improve the cognitive and skill achievement of the students .

- **Study (Khazal, 2019 AD)**

This study was conducted in Iraq. It aimed to identify the effect of Perry and Keren's model on the acquisition and retention of concepts among first-grade intermediate students in mathematics. The researcher used the experimental approach. According to Perry and Keren's model, an officer studied according to the usual method of teaching,

the research tool: the test of acquiring mathematical concepts according to three levels for each concept, namely (concept definition, concept distinction, and concept application) consisting of (51) objective paragraphs (multiple choice)) By (17) basic mathematical concepts for each concept, three paragraphs according to the levels of acquisition of the concepts, the statistical means: the T-test. The results indicated the superiority of female students of the experimental group over female students of the control group after a comparison between the mean scores of the students of the two groups in the acquisition test.

Aspects of the use of previous studies

- ❖ Giving an idea in crystallizing the problem of the current research.
- ❖ See and benefit from the list of references and sources related to the current topic of research.
- ❖ Create an objective perception of the trends of those previous studies in their study of dependent variables to be used in the current research.
- ❖ Make use of the statistical methods that were relied upon in previous studies, and the appropriate statistical method for designing the current study and analyzing the data.
- ❖ To benefit from the results of previous studies as evidence of the importance of the current research.
- ❖ Make use of similar studies procedures in building the research tool (mathematical concepts acquisition test).
- ❖ Compare current research results with previous studies.

Search procedures:

First: Experimental Design:

An experimental design was used for two groups, one of them is experimental and the other is control, as the strategy of searching for the other half represents the independent variable of the experiment, while the acquisition of mathematical concepts represents the variable of the experiment, and the two groups were rewarded in the following variables (intelligence, chronological age, previous information in mathematics, and previous achievement In mathematics, the academic achievement of the parents).

Second: Research Population & Sample:

Research Population: Determine the research population of fifth grade primary students in the governmental primary day schools of the General Directorate of Education in Baghdad Governorate / Rusafa II / for the academic year (2020-2021 AD).

Research sample: The mixed suns elementary was chosen intentionally to apply the research experiment, as the research sample consisted of (60) male and female students and by four people, two experimental and two control.

Third: Control procedures:

The research variables were confirmed by parity between the experimental and control group students in some variables (intelligence, chronological age, previous information in mathematics, previous achievement in mathematics, and the academic achievement of the parents). As shown in Table (1)

Table (1)

The experimental and control groups are equivalent in variables (intelligence, chronological age, previous information in mathematics, previous achievement in mathematics, and academic achievement of parents

Statistical significance at (0.05) level	T-value		Degree of freedom	standard deviation	SMA	Division	The number of the sample	Grouped	Variables
	Tabular	Calculated							
Not a function	2,00	0,052	58	4,77	21,20	C, d	30	Experimental	Intelligence
				5,16	21,30	e ,f	30	Control	
Not a function	2,00	0,09	58	2,81	111,60	C, d	30	Experimental	Chronological age
				2,68	111,67	e ,f	30	Control	
Not a function	2,00	0,073	58	1,77	8,40	C, d	30	Experimental	Previous achievement
				1,75	8,37	e ,f	30	Control	
Not a function	2,00	0,216	58	2,39	8,70	C, d	30	Experimental	A test of prior knowledge
				2,39	8,83	e ,f	30	Control	
Not a function	Chi-square value		2			C, d	30	Experimental	Father's academic achievement
	Tabular	Calculated				e ,f	30		
	5,99	0,268							
Not a function	5,99	0,74	2			C, d	30	Experimental	Maternal academic achievement
						e ,f	30	Control	

Fourth: Research Accessories:

1- Determining the scientific subject: The scientific subject was determined according to the curriculum content from the mathematics book for the fifth grade primary, first edition, and for the chapters to be taught during the first semester of the academic year 2020-2021 AD (first: large numbers, second: adding and subtracting large numbers, The third: multiplying numbers)

2- Defining the concepts: To achieve the goal of the research, it was necessary to analyze the scientific material for the research and extract the concepts. The main concepts were extracted. Their number reached (7 main concepts) and the subsidiary number reached (13).

3- Formulation of behavioral objectives: Behavioral goals are formulated according to Merrill levels of behavioral goals, which include three levels (remembering, applying, and exploring)

4- Preparing the teaching plans: A group of teaching plans was prepared, totaling (18) daily teaching plans, with (9) plans for each group of the two research groups.

Fifth: Research Tool**1- Determining the number of test items**

The researchers adopted a classification (Badawi, 2003), which can be measured in three paragraphs for each concept, namely (defines the concept, distinguishes the concept, and applies the concept) (Badawi, 2003: 64)

The mathematical concepts acquisition test was prepared in light of the three levels, and since the number of the main concepts is (7) a concept, so the total of the test items reached (21) items, with three items for each major concept, provided that the main concept paragraphs include the sub concepts, and the paragraphs were from Multiple choice type with four alternatives, one of which is correct.

2- Validity**A- Validity Face**

The test items were presented with the answer instructions and the correction key to a group of specialists to judge the apparent validity of the test and based on their opinions, they were modified.

B- Content Validity

The validity of the content was verified by covering all the main concepts and sub-concepts in the test, and there were (20) main and sub-concepts.

3- Statistical analysis for test items

The test was applied to an exploratory sample consisting of (186) male and female students of the fifth grade of primary school in the schools (Al-Aaly, Abdullah bin Masoud and Al-Aseel) affiliated to the Second Rusafa District.

A- Items difficulty coefficient:

The difficulty factor was calculated and found that its value ranged between (0.31-0.74). Thus, all the paragraphs are considered acceptable in terms of the difficulty factor, and none of them were omitted.

B- Items Discrimination Coefficient:

The discriminatory power was calculated and found to range between (0.33-0.70). Thus, all the paragraphs are considered acceptable in terms of their discriminatory ability, and none of them were deleted.

C- Distracters Efficiency of:

The effectiveness of each alternative was calculated incorrectly. It was found that the coefficients of all alternatives are negative and thus all alternatives are considered effective

D- Test Reliability:

The test reliability was calculated using the Koder-Richard equation 20, where the test reliability coefficient reached a reliability coefficient (0.84), which is a good and high reliability coefficient.

Sixth: Application procedures

The application of the experiment began on Wednesday 11/30/2020 AD with (4) attendance classes in the school, two experimental and two officer on Wednesday, and (6) electronic classes, three experimental and three control days (Monday, Tuesday, Thursday) as the experimental group was studied accordingly On the strategy of searching for the other half, while the control group was taught in the usual way of teaching, then the mathematical concepts acquisition test was applied on Wednesday, 1/27/2021 AD on the experimental and control research groups after completing the teaching of the course determined for the experiment and the students' answers were corrected according to For the method of correction adopted in the research procedures, the experiment ended on Wednesday 10/2/2021 AD.

Seventh: Statistical methods

1- T-test for two independent samples (t-test):

2- chi-square equation test:

3- The difficulty factor equation:

4- Paragraph discrimination equation:

5- Equation of the effectiveness of alternatives

6- The KR- 20 equation

7- The Statistical Bag for Social Sciences and the Excel program

Presentation of the Results

1. The first hypothesis: It states that (there is no statistically significant difference at the level of significance (05,0) between the average scores of students who studied according to the search strategy for the other half and the average scores of students who studied according to the usual method of teaching in the concept acquisition test.)

The result of the first main null hypothesis: -

Table (2): Results of the T-test for students of the two research groups in the acquisition of mathematical concepts test

indication 0,05	T-value		The degree of freedom	standard deviation	SMA	the number	Grouped
	Tabular	Calculated					
Function	2,00	5,99	58	3,14	14,60	30	Experimental
				2,22	10,40	30	Control

Which indicates the existence of a statistically significant difference between the average scores of the experimental group that was studied on the search strategy for the other half, and the average of the control group's scores that were studied in the usual way of teaching in favor of the experimental group, and accordingly the null hypothesis was rejected.

The result of the first sub-null hypothesis: -

For the purpose of verifying this null hypothesis, which states that (there is no statistically significant difference at the level of significance (0.05) between the average grades of the fifth grade primary students who study according to the search for the other half and the average scores of the

For the purpose of verifying this hypothesis, the mathematical concepts acquisition test was applied to the two research groups, and after the correction of the scores, the arithmetic mean of each group was extracted, so the average of the experimental group reached (14.60) with a standard deviation (3.14), while the average scores of the control group were (10.40) degrees and a standard deviation (2.22), and when using the t-test for two independent samples, to measure the significance of the difference between the two averages, the calculated t value reached (5.99), which is greater than the tabular t value of (2.00). , At the level of (0.05) and the degree of freedom (58), and Table (2) illustrates this

students who study the same subject according to the search strategy for The other half of the mathematical concepts acquisition test), the mathematical concepts acquisition test was applied to the two research groups, and after correcting the scores, the arithmetic mean of each group was extracted. The average grades of the students of the experimental group are (14.33) with a standard deviation (3.24). When using the t-test for two independent samples to measure the significance of the difference between the two averages, the calculated t value reached (0.46), which is less than the value Tabular T, amounting to (2.04), at the level of (0.05) and with the degree of freedom (28), and Table (3) shows that

Table (3): The results of the T-test for students of the experimental group in the acquisition of mathematical concepts test

indication 0,05	T-value		The degree of freedom	standard deviation	SMA	the number	Grouped
	Tabular	Calculated					
Not a function	2,00	0,46	28	3,11	14,87	15	Pupils
				3,24	14,33	15	Schoolgirls

This indicates that there is no statistically significant difference between the average scores of the experimental group students who studied according to the search strategy for the other half, and the average scores of the experimental group students who studied on according to the search for the other half strategy, and accordingly the null hypothesis was accepted.

The result of the second null hypothesis:

For the purpose of verifying this hypothesis, which states that (there is no statistically significant difference at the level of significance (0.05) between the average scores of the experimental group students who studied mathematics according to the search strategy for the other half and the average scores of the control group students who

studied the same subject according to The usual method of teaching in the mathematical concepts acquisition test), the mathematical concepts acquisition test was applied to the two research groups, and after the grades were corrected, the arithmetic mean of each group was extracted, so the average of the experimental group students reached (14.87) degrees with a standard deviation (3.11). Whereas, the average score of the control group students was (10.67) with a standard deviation (2.53). When using the t-test for two independent samples, to measure the significance of the difference between the two averages, the calculated T value was (4.06), which is Greater than the tabular T value of (2.00), at the level of (0.05) and with a degree of freedom (28). Table (4) shows that

Table (4): Results of the T-test for students of the two research groups in the acquisition of mathematical concepts test

indication 0,05	T-value		The degree of freedom	standard deviation	SMA	the number	Grouped
	Tabular	Calculated					
function	2,00	0,46	28	3,11	14,87	15	Experimental
				2,53	10,67	15	Control

This indicates the existence of a statistically significant difference between the average scores of the students of the experimental group that were studied on the search strategy for the other half, and the average scores of the students of the control group that were studied in the usual way of teaching and for the benefit of the experimental group, and accordingly the null hypothesis was rejected.

The result of the third null hypothesis:

For the purpose of verifying this hypothesis, which states that (there is no statistically significant difference at the level of significance (0.05) between the average scores of the experimental group students who studied mathematics according

to the search strategy for the other half and the average scores of the control group students who studied the same subject according to The usual method of teaching in the mathematical concepts acquisition test), the mathematical concepts acquisition test was applied to the two research groups, and after the grades were corrected, the arithmetic mean of each group was extracted, so the average of the experimental group students reached (14.33) degrees and a standard deviation (3.24). Whereas the average scores of the control group students reached (10.13) with a standard deviation (1.92), and when using the t-test for two independent samples to measure the significance of the difference between the two averages, the calculated T value was (4.31), which is Greater

than the tabular T value of (2.00), at the level of (0.05) and with a degree of freedom (28). Table (5) shows that

Table (5): The results of the T-test for the students of the two research groups in the acquisition of mathematical concepts test

indication 0,05	T-value		The degree of freedom	standard deviation	SMA	the number	Grouped
	Tabular	Calculated					
function	2,00	4,31	28	3,24	14,33	15	Experimental
				1,92	10, 13	15	Control

This indicates the existence of a statistically significant difference between the average scores of the pupils of the experimental group who studied on the search strategy for the other half, and the average scores of the pupils of the control group who studied in the usual way of teaching in favor of the experimental group, and accordingly the null hypothesis was rejected.

Second: results interpretation

The results showed that the experimental group students who studied according to the search for the other half were superior to the control group students who studied according to the usual method of acquiring mathematical concepts for the benefit of the experimental group.

The superiority of the experimental group over the control group is due to many reasons, the most important of which are:

- ❖ This strategy creates a dynamic atmosphere in the school classroom and adds a kind of fun, fun and activity in the educational process
- ❖ It increases the work of the learners, and helps to increase the production of work among the learners.
- ❖ Social relations are developed between the learners with each other and between the learners and the teacher, and the learners become accustomed to following the rules of work and develop positive attitudes and values for them.
- ❖ It develops the positivity of the learner in the classroom, and allows learners the opportunity to follow up and evaluate their level during the school year.

The results of the current research partly agree with the results of previous studies presented by the researcher on the impact of the search strategy for the other half on the different type of dependent variable and subject matter, such as the study (Al-Dweik, 2018) and the study (Al-Azzam, 2019).

Third: Conclusions

In light of the research results, the following concludes:

- ❖ The possibility of applying the strategy of searching for the other half on the fifth grade of elementary students in mathematics.
- ❖ The search for the other half strategy gives students an important role in the (educational-learning) process by giving examples that are related and not belonging to their experiences, and reformulate the concept of definition according to their own style.
- ❖ That teaching according to the search strategy for the other half contributed to the survival of the subject matter among the fifth grade students for a longer period than teaching according to the usual method.

Fourth: Recommendations

In light of the results of the current research, the researcher recommends the following:

- ❖ Activate the use of the search strategy for the other half and (Kagan structures) for cooperative learning in teaching mathematics at the elementary and intermediate levels.
- ❖ Conducting a study dealing with the use of Keegan structures in other subjects such as science and the Arabic language ... compared to the usual method of teaching.
- ❖ Benefit from this study by preparing for the lessons and plans developed by the researcher to obtain model shares using the search for the other half strategy.
- ❖ Urging students to team work because it is essential in learning science in general and mathematics in particular, and it is also the focus of the search strategy for the other half.
- ❖ Using the search strategy for the other half in teaching the rules of mathematics, for

its effectiveness in acquiring mathematical concepts.

- ❖ Enriching the mathematics textbook for the fifth grade of elementary school with multiple activities that motivate learners to acquire mathematical concepts and with the three operations (definition of the concept, distinction of the concept, application of the concept) and benefit from the mathematical concepts acquisition test prepared for this research.

Fifth: Suggestions

To complete the current research, the following is suggested:

- ❖ Conducting a study that investigates the impact of the search strategy for the other half of cooperative learning on new variables such as achievement, tendency, numerical sense, motivation, and types of thinking.
- ❖ Conduct studies and research in other methods of the Keegan structures for cooperative learning other than those currently conducted in mathematics such as Fan-N-Pick, Round Table, Special Envoy, Ask-Ask-Instead of Quiz-Quiz-Trade.
- ❖ Conducting a study on the effectiveness of the search for the other half in creative thinking.
- ❖ Conducting a comparative study between the search for the other half strategy and other strategies, and knowing their impact on acquiring and retaining concepts.
- ❖ Conducting a study to identify the effectiveness of the search for the other half in correcting the misconception of mathematical concepts among fifth grade primary students.
- ❖ Conducting a study to identify the effect of the search strategy for the other half on fifth grade students' achievement in mathematics rules and the development of their interactive thinking.

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