The effectiveness of Showdown and concept connection strategies on logic thinking of second intermediate grade students and their achievement in mathematics

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Summary:

The aim of the urging is to know the effects of the concept and confrontational link strategies (reveal your papers) on mathematical achievement and the development of logical thinking among middle school students, in order to achieve the goals of the research. The first according to the concept links strategy, and the second experimental group, which was studied according to the confrontational strategy (reveal your papers), and the research sample consisted of (54) students from the second intermediate class students distributed equally among the three groups, and they were examined The sample of the research is divided into a total of a control group (taught in the traditional way, and they are 28). To apply the research, the research tools were built, and they are an achievement test that included (40 paragraphs) consisting of objective questions of the type (multiple choice), after the decision was analyzed and then verified. From his honesty and consistency, with the formulation of behavioral goals, and a logical thinking test in mathematics. The sincerity of the building was verified by presenting it to a group of arbitrators and specialists in educational sciences and methods and methods of teaching mathematics, and the experiment was applied in the first and second semesters of the academic year 2018/2019, as the researcher Teaching two research groups For two experimental experiments, the first experimental relying on the concept and concept experimental links strategy with the confrontational strategy (reveal your papers), while the control group studied it according to the usual method. Then the achievement test and the logical thinking test were applied dimensionally to the two experimental groups for research and then obtaining the data necessary for statistical analysis and reaching the

desired results. To test the validity of the assumptions data was collected and then statistically analyzed using the following **appropriate statistical means:**

T-test for two independent and non-independent samples, alpha-Cronbach equation, Pearson correlation coefficient,

Gtman link).

The results of the research reached the effectiveness of both the concept link strategy and the confrontational strategy (reveal your papers) in increasing student achievement and developing their logical thinking more than the usual method. In light of the results of the research, the researcher recommended several recommendations, the most important of which is the necessity of adopting new strategies for teaching mathematics to reduce the difficulty of the subject for some students, especially the active learning strategy, and conducting more research on the strategy of revealing your papers and the concept of link strategy, given the absence of Arab studies from them.

Research problem:

Despite the great efforts made to develop mathematics curricula and then the strategies that help in their application, these efforts have not been able to cover aspects of modern trends in mathematics teaching, which requires more effort to apply the latest global strategies, as teachers practice active learning strategies Especially modern strategies, one of the most important means that helps to enhance students 'academic achievement. Also, these strategies develop sound scientific logical thinking among students, and the current research problem lies in the low level of mathematical logical thinking skills and the ranks It has abilities such as induction, deduction, and deduction, to reach the results of students in tests of modern trends in teaching science and mathematics (Al-Masad and Shatnawi, 2007, p. 7), and therefore there is an urgent need to apply the latest global strategies to keep pace with those trends and raise the level of the Arab student in general and Iraqi in particular towards sound logical thinking.

Thinking students who think logically get high marks in mathematics and science because they think of logical connections because they work better when they can collect the information they need logically (Latif, 2010, p. 113), and then developing

logical thinking becomes one of the methods that helps students To enhance their achievement, and the current research problem in implementing a very recent strategy in the Arab world has resulted in it.

There is also a clear problem in students 'achievement of mathematics that the researcher has touched by virtue of the nature of his work and its friction with school environments. Several studies have indicated a decrease in the level of achievement of students in mathematics, including a study (Hlehel, 2006, p. 35) which reached a decrease in the level of students in Arab countries Compared to the rest of the world, the study confirmed that one of the most important reasons for the low athletic achievement of students is to follow the traditional methods of teaching the subject, also the study (Al-Sheikhi, 2012) showed the weakness of students who participated in the international competitions of TIMMS from Arab and Islamic countries compared to the rest of the students. Qin, and stressed the need to develop and follow modern teaching strategies that contribute to enhancing the achievement of students, as the study (Al-Akhras, 2018) confirmed that teachers have followed the traditional teaching methods and strategies is the most prominent factors that cause students 'low achievement, and therefore the researcher found that the research problem is centered On the necessity of applying new strategies in mathematics to enhance both achievement and logical reasoning among students.

The research problem also arises by asking the following questions and seeking to answer them- :

Research questions:

1- How effective is the concept link strategy in the achievement of the second intermediate-grade students of mathematics?
2- What is the effectiveness of the confrontational strategy (reveal your papers) in the achievement of middle school students for the second year of mathematics?
3- What is the effectiveness of the concept bonds strategy in developing mathematical logical thinking among middle school students?
4- What is the effectiveness of a confrontational strategy? Expose your papers in developing mathematical logical thinking among middle school students?

The importance of research: First: the theoretical importance of research:

The theoretical importance of the research is due to:

1 - The research derives its importance from being the first research of its kind in the Arab world, if not in the whole world according to the knowledge of the researcher who applies two modern strategies from active learning strategies, which are the concepts of concept and confrontation (reveal papers.(

2 -The research reviews the literature and previous studies related to mathematics teaching strategies, which enriches the scientific research library and opens horizons for future research.

3 -The research highlights the strategy of revealing your papers as the first Arab research to do so, according to the researcher's knowledge

4- The research provides a reflection of the newly applied methods globally through presenting the steps and elements of implementing a modern strategy, which are concept links

Second: The applied importance of research:

1- The current research derives its applied importance from being a field research that implements new strategies of its kind within active learning strategies.

2- The research contributes to drawing the attention of those involved in the application of teaching strategies, whether curriculum designers, educators, teachers to modern strategies for teaching mathematics, especially an interesting and interesting strategy such as the proposed strategy (reveal your papers), and an important strategy for the field of mathematics which is the concept link strategy.

5- Research tools such as a test may be used to measure mathematical achievement for middle school students and another to measure logical thinking in future educational studies.

6- The research presents a booklet for the teacher with lessons designed according to a strategy to reveal your papers that may be a guide for him to put more lesson plans in mathematics

7- The research presents teaching plans and activities designed according to the strategic steps of the concept links. Mathematics teachers may later help facilitate some of the mathematical concepts.

Objectives:

The current research aims to:

1- Knowing the effectiveness of both the concept link strategy and the coping strategy (revealing your papers) in the achievement of the second intermediate-grade students in mathematics
2- Knowing the effectiveness of both the concept link strategy and the coping strategy (revealing your papers) in developing mathematical logical thinking among middle school students

Hypotheses: The research seeks to verify the following hypotheses:

The first hypothesis: There are no statistically significant differences between the mean scores of the first experimental group that was studied by applying the concept link strategy and the control group that studied the usual way in mathematical achievement in the second intermediate grade students.

The second hypothesis: There are no statistically significant differences between the mean scores of the first experimental group that was studied by applying the concept of link strategy and the control group that were studied in the usual way at the level of significance (0.05) in the logical thinking test among the second intermediate grade students.

The third hypothesis: There are no statistically significant differences between the mean scores of the second experimental group that was studied by applying the concept of link strategy and the control group that was studied in the usual way at the level of significance (0.05) in the mathematical achievement test for the second intermediate grade students.

The fourth hypothesis: There are no statistically significant differences between the averages of the degrees of the second experimental group that was studied by applying the confrontational strategy (reveal your papers) and the control group that

studied in the usual way at the level of significance (0.05) in the mathematical logical reasoning test for middle second grade students.

the border:

Time limit: the research will be applied in the academic year 2018-2019

Spatial limit: The research is applied in Al-Majd Intermediate School for Boys in Baghdad

Human limit: The research is applied to a random sample of middle school second-graders

Defining terms:

Active learning:

Mutawa and Khalifa 2015 define him as "an educational learning situation, carefully planned and executed carefully and in order to develop the learner to the fullest extent permitted by his capabilities under the supervision and guidance of the teacher according to what is available from the educational capabilities (Mutawa and Khalifa, 2015, p. 24(

The researcher defines it procedurally in this research as: "a method of learning based on activities and interaction that depends on the exchange of knowledge between students and belongs to the structural theory that sees learning as an interactive social constructive process"

Showdown: Because there is no specific definition of it within the studies and available resources known to the researcher as "one of the active learning strategies and based on the interaction between the teacher and students and between students and each other, it is characterized by constructive interaction and inclusion of the calendar in it".

Concept link strategy: concept connection

It is a branched network of concepts in which the student connects between previous and new concepts in a way that develops visual intelligence and interconnection skills between ideas and concepts (Ambosaidi and Hassania, 2016, p. 211(

And procedurally defined in the current research as "a strategy within active learning strategies, that helps the teacher to recall the previous ideas of students, then link them to the new concept to be studied in circles that are related to each other in the form of a map or a network that includes the main concept in the center and around it is related to what the students suggested from Their previous acquaintances"

Achievement: Achievement

Muhammad, 2016, defines mathematics achievement as "what the student acquires in terms of concepts, generalizations and mathematical skills after studying the subject matter" (Muhammad, 2016, p. 9(

The researcher defines it procedurally in this research as "the total score obtained by students in a test".

Mathematics achievement

Mathematical logic thinking: Abd al-Hadi defines him as "the tools of the mind that man uses to test his ability to understand, analyze, and evaluate the information he encounters in his private and public life".

Albercht, 2012 defines it as a chain process that includes the use of important ideas, facts and conclusions contained in a problem and then arranges them in the form of a progressive series, which means thinking about steps.

The researcher defines it procedurally in this research as "that thinking that enables the student to link the cause to the outcome and helps him to perform higher mental processes such as reasoning, deduction, deduction and other processes that help him learn mathematics and the logic required to understand the postulates and mathematical laws"

Chapter II:

Theoretical framework:

The first pivot: active learning and strategy, concept and confrontational links, reveal your papers:

A sound choice of teaching strategies helps achieve the aforementioned skills and abilities of students. Modern teaching strategies have integrated features that allow determining a large effectiveness of education through communication and the great interaction between the teacher and the student and the educational subject, and the resulting characteristics of self-assessment and immediate and remove the elements of fear and dread on the part of the student, and most of the research conducted through teaching and its recent strategies have shown that It clearly contributed to facilitating the teaching process (Ahmad, 2018, p. 199), and in the context of the search for the best methods, strategies and theories for teaching mathematics, structural theory emerged and emerged from what we now call active learning. Active learning is already one of the most common types of learning that accompanies the times, (Loranzen, 2006: 87) indicates that active learning is that "learning that allows the student to participate actively in activities in the classroom, to shift the student's role from the regular role he plays, to The role in which he becomes the leader in various activities with his colleagues during the educational learning process. ”Active learning is also an introduction to learning that provides opportunities for teachers to speak, write, read and meditate in a meaningful way in the content, ideas and issues presented to them (Al-Rihawi and Abu Al-Qasim, 2016, 666(

Speaking of mathematics as a distinct subject and intertwined with the student’s real life, one of the most important directions that should be taken when dealing with the content of school mathematics is to increase the achievement and development of the direction towards mathematics among students through teaching mathematics, especially through the use of active learning and its various strategies (Al-Maliki, 2010, p. 17).

The many and many active learning strategies are among the most positive strategies for students ’achievement and logical thinking, especially in mathematics, as much research has proven the effectiveness of using these strategies in teaching

mathematics, including Ahmed 2018 and Abu Ghaly 2010 studies that have proven the effectiveness of active learning strategies in developing thinking Among students and enhancing their achievement, the confrontational strategy (reveal your papers) is one of the distinct, enjoyable and effective active learning strategies where Al-Shammari, 2011AD indicates in his book "101 strategies" that the confrontational strategy (reveal your papers)) It is a fun strategy that may be used at the end of the lesson or unit in the evaluation stage appropriate method for the primary stage (Al-Shammari, 2011, p. 28(

As stated by Abu Al-Hajj, 2016, this strategy is distinguished by making learning fun, which attracts the student and enhances his focus and thinking (Abu Al-Hajj, 2016, p. 70).

Steps to implement the strategy:

1- The teacher or students design themselves cards containing questions and their answers about the lesson,

These cards are placed in the middle of the table.

2- Students are divided into groups, so that one group contains four students.
3- Students select a leader each time their job: choose the question card, read the question, then write with

Other classmates answer either on paper or in a small blackboard for each student.

4- When students finish writing their answers, the leader will ask them to disclose their papers with a word

For example (disclose your papers).

5- The leader congratulates students with the correct answers and asks them to explain to students who did not answer or were wrong to solve the question.
6- The method is changed by changing the leader of each group (Al-Shammari, 2011, 28).

Concept link strategy

The strategy aims to link past knowledge about a topic using a concept map

To implement the strategy, the teacher follows the following steps:

•Write a new topic or concept that students will explore in the new lesson on a blackboard or board, then draw a circle around the word denoting the concept

•Invites students to tell him any information they know that relates to the concept, makes divisions (branches) for each component suggested by students about the concept circle, asking students to provide more ideas related to the branches related to the circle about the concept (the central circle) or from other ideas.

•Upon reaching 10-12 elements of the concept map, the class is divided into cooperative groups of 5 students.

•After all groups have copied the first part of the map, the teacher will ask them to complete the map on a sheet or chart, and leave them for a time period of about ten or twelve minutes

•After the groups are finished, the maps they designed to create an exhibition to discuss the similarities and differences are suspended

•The teacher displays a list of the main sub-topics of the concept, showing how these topics relate to students 'previous knowledge or ask students to think about how these topics relate to their ideas. (James, 2009, p103(

The second axis: achievement in mathematics:

Achievement is defined as the amount of information a student retrieves at the lowest level of knowledge (the level of knowledge that depends on preservation) and at the higher level in the areas of understanding, application, analysis and synthesis with effecting behavioral changes in the student's attitudes, values, and personality as a whole (Mikhael, 2002, 288(

Academic achievement is considered a function of academic performance as a goal, which students of science seek at all educational levels because achievement in it entails many things such as building the human personality and its development or

achieving self or feeling satisfied or personal happiness or self-assertion and self-confidence or a sense of control or satisfying the need for exploration, and it follows He must get the reward (Raddadi, 2002, 15(

The aim of measuring academic achievement is to obtain information that shows the extent of what students obtained in a direct way from the contents of a particular subject, and also aims to reach information on the order of students in achievement in a particular experience and their positions in relation to their group and other groups, and the goal of academic achievement is not limited to that but extends to Attempting to draw a psychological picture of students' mental and cognitive abilities and their achievement in various subjects (Jad Allah, 1998, 4(

The third axis: logical thinking:

Logical thinking: It is the thinking that is practiced when trying to explain the reasons and causes that lie behind things, and trying to know the results of business; but it is more than just defining the reasons or results, it means obtaining evidence that supports or proves or denies the point of view. (Abu Ghali, 2010, 65(

It is a type of thinking aimed at obtaining a result from the introductions. Logical reasoning is based on extracting the necessary implications from the introductions or those that are consistent with them, as the extraction of the necessary implications from the introductions or those that are consistent with them, and that extracting the correct results from the introductions is subject to the rules of logic (Thursday, 2012, 11(

Logical thinking characteristics:

Logical reasoning has the following advantages

1- Looking for the reasons behind the occurrence of things.
2- It is affected by the culture in which the individual lives.
3- It advances culture in society.
4- He is interested in knowing the causes and causes behind the apparent events.
5- It includes individuals knowing and predicting the results of their actions.
6- It aims to obtain evidence to prove or deny the assumptions or alternatives.
7- Begins with what is tangible to what is just.

8- -It includes higher mental and cognitive processes such as organization, abstraction, comparison, classification and representation

Deduction, induction and reasoning.

9- It is affected by the individual's mental capabilities of intelligence and advice, the individual's experiences and the environmental conditions surrounding him.

10 -It grows as the child ages. (Abdel Aziz, 2009, 54)

Among the most important characteristics of logical thinking is that it is conscious thinking that is based on mental processes and its effects are inferred, as it is an evolving thinking that grows with age and the acquisition of experiences and is a systematic scientific thinking with clear methods, and also it develops through the search for relationships between things and linking them together, as it is multi-level thinking Treatments depend on a set of mental processes, including comparison, classification, organization, abstraction, generalization, analysis, synthesis, inference, deduction, and induction (Shabbat, 2012, 6) .

Among the most important characteristics of logical thinking that are reflected in the learning of mathematics, what Piaget mentioned is represented in:

A- Prepositional Reasoning

This reasoning requires an individual to be able to infer the nature of the proportional relationship between more than

An element using proportion and proportion.

B - Control variables: Controlling Variables

It requires the individual to be able to isolate factors that affect a particular phenomenon from a set of factors

Determined by it.

C- Correlational Reasoning

It requires an individual to be able to study quantitative relationships between group or group elements and define

Ratios of each, then compare the ratios and finally give certain possibilities.

H-harmonic inference: Combinatorial Reasoning

It requires the individual's ability to do experimental or theoretical work to make the largest possible number of connections between

Elements under study and provided that the links are organized, coordinated, and not random or duplicate (Al-Khalili et al. 1996, 123). The relationship between logical thinking and mathematics:

Evidence of mathematical logical reasoning clearly appears in the student's ability to perceive the elements of a given situation or problem and to distinguish the mathematical relationships between its elements, to understand the meaning of abstract mathematical concepts and to give examples and no examples, and to be able to perform mathematical operations mentally, and to use mathematics language symbols, and the ability to Linking premises to results and causes to their causes and making logical assumptions (Adam, 2017, 162).

Mathematics, because of its characteristics in terms of content and method, is a fertile field for training students in sound thinking methods. Mathematics as a constructive structure based on introductions of knowledge, non-knowledge, axioms, and postulates, and finding relationships between these introductions using logical rules and laws makes it an excellent field for acquiring methods of sound logical thinking. (Hassan, 2011, p. 11)

The importance of developing logical thinking:

Mathematical educators generally agree on the need to develop logical thinking among students, logical thinking is necessary for thought, and it cannot be dispensed with in the processes of knowledge acquisition, problem solving and decision-making, and the development of logical thinking is not only a goal of math education, but rather a tool for learning mathematics, especially as new directions focus To solve the problem that requires more mathematical proof skill (Abdel Dayem, 2003, 23), as suggested by the World Conference for UNESCO in Hamburg, and the Sixth Arab

Teachers Conference to teach mathematics, giving students usually, accuracy in expression, and the habit of logical thinking in solving the problem T. (Khader, 1988.16)

Previous studies:

Given the lack of any previous Arab study that dealt with the strategy of concept and face links (reveal your papers) according to the knowledge of the researcher, a few foreign studies are listed as they are also scarce.

1- Njenga Study 2010

I aimed to find out the effect of cooperative learning strategies on student achievement. The study relied on several strategies, including the confrontational strategy. Expose your papers. 51 students who study algebra were selected as a research sample, they were divided into two control groups that were studied in the traditional way (22 students), and an experimental study with cooperative learning strategies (31) , And the results have proven the effectiveness of cooperative learning strategies, especially the strategy of revealing your papers in students' achievement of algebra.

2- Custodio & Dolotalas Study (2018:(

This study aimed to know the statistical differences between the scores of students in algebra who studied the lecture method and the way to show your papers showdown, where the experimental method was used and the study sample was divided into an experimental group of (26) students who received algebra lessons using the confrontational strategy (reveal your papers), A control group consisting of the same number was studied using the lecture method, and both groups underwent a pre- and post-test, and there were significant statistical differences in favor of the experimental group that studied the strategy of revealing your papers in the post-algebra test, which indicates the effect of that strategy clearly Teaching algebra.

Advances from previous studies:

The researcher benefited from his knowledge of previous studies, including many benefits, including:

1- Learn about active learning strategies, its **characteristics and advantages**
2- Previous studies assisted the researcher in preparing the research tools represented in the achievement test and the logical thinking test
3- Knowing the logical thinking skills, which helped in developing the test to measure these skills.
4- The studies helped the researcher to choose the appropriate method and design for the research.
5- Identify the statistical methods best suited to the research variables.

Chapter Three: Research Methodology and Procedures

Study Approach:

A quasi-experimental approach based on two groups, one control and one experimental, were used

study design:

The research took the experimental design according to the following table:

Table (1) Experimental Design for Research

Post application	Experience	Tribal application	the group
Tribal application for mathematical achievement test and logical reasoning test	Teaching using concept link strategy	Tribal application for mathematical achievement test and mathematical logical reasoning test	The first pilot
	Teaching with coping strategy (reveal your papers)	Tribal application Tribal application	The second pilot

	Teaching in the traditional way		0ntrol

Research community: The research community identified second-grade middle school students at Al Majd Intermediate School in Baghdad

The research sample: The research sample was chosen intentionally and was divided into three groups: the control group which was studied in the traditional way and its number (18) students**, the first** experimental group which was studied by applying the concept of linking strategy and their number (18), and **a second** experimental group that was studied using the confrontational strategy (disclose Your papers) and also numbered (18 students(

Third: Procedures for controlling the equivalence of the research sample: The three groups were rewarded with a number of variables, namely (previous knowledge, chronological age, previous achievement in mathematics, logical thinking test). These variables were determined by obtaining information about chronological age and previous achievement in mathematics from School records. As for previous knowledge, students 'grades were obtained after testing them, examining their answers and determining the grades of each of them. When comparing the average scores of the experimental and control research groups using the test (t-test) for two independent samples, it was found that the calculated value of t was (1.4). a Here less than the tabular value of $ ((2 in the three variables, which means equality of the three groups mentioned variables

Study materials and tools:

1- Teaching booklet using the concept link strategy
2- Teaching booklet (teacher guide) for coping strategy (reveal your papers(
3- Achievement test in mathematics (the unit of relative numbers mentioned in the first part of the math book for the second intermediate grade, edition of 2017(

4- Logical thinking test

The preparation of the research tools required analyzing the content of the unit of relative numbers to determine the elements of mathematical content that they include, as well as the preparation of a table of specifications for **the objectives of the teaching unit, and the analysis went according to the following steps:**

1- Defining the content elements (learning aspects) that are included in the unit of relative numbers, concepts, skills, and generalizations
2- Analysis of the content of the chosen unit and the unit of relative numbers mentioned in the first part of the math book for the second intermediate grade / edition of 2017.
3- Preparing a form for content analysis consisting of a table containing the unit's topics and their skills, concepts and generalizations
4- The stability of the analysis: The stability of the test was confirmed by unit analysis and then the analysis was repeated after three weeks, where the Holste equation was used to calculate the stability factor as follows:

Stability coefficient = m2 / n1 + n2, where m is the number of units agreed in the analysis, and n1 is the number of units of the first analysis and n2 is the number of units of the second analysis, and the test stability values were 0.91 which is a high stability ratio which means confidence in the analysis.

Validity of the analysis: To ensure the validity of the analysis, the analysis form was presented with a copy of the unit set for the relative preparation on the number of arbitrators with experience, specialization in measurement and evaluation, and in the methods of teaching mathematics, and the analysis was adopted in the light of the opinions of the arbitrators.

Preparation of study tools:

A- Teaching brochures using both the concept link strategy and the coping strategy (reveal your papers(

To prepare each booklet, the following steps were followed:

1- Determine the important goals of the selected unit (relative numbers(
2- Analysis of unit content

3- See the literature and previous studies to benefit from it

4- Each brochure includes the following:

The educational and philosophical foundations of the proposed strategy - a list of lessons included in the unit - the teaching aids and tools used - the time plan needed to implement the unit - instructions for the teacher - the unit lessons plan according to the proposed strategy

5- The brochures were presented to a group of specialists in the curricula and methods of teaching mathematics for the purpose of obtaining their opinions, proposals and observations. The researcher reached the booklet in its final form based on the opinions of the arbitrators.

B- Preparing the achievement test:

The goal of the test: To measure the mathematical achievement of students of the research sample (middle second grade students) from the two experimental groups that studied according to the concepts of concept and confrontation strategies (reveal your papers) and the control group that studied according to the usual method and to judge which method is best in achieving the teaching goals

Steps to test preparation:

After reviewing the previous studies related to the subject of this study, especially that included the tests as a tool for it, the researcher prepared the achievement test to measure students' achievement of the concepts and mathematical skills mentioned in the unit of relative numbers mentioned in the math book for the second intermediate grade, and it was used to verify the results of the study. The experiment is applied. The same test is approved to be a post-test to measure the achievement. Below is a description of the procedures followed in constructing the test, and the steps to verify Ge and stability- :

1- Refer to the textbook set for the mathematics curriculum and the teacher's guide, and extract the main and sub-concepts, in which the general and specific goals are achieved. The basic principles unit of relative numbers has been chosen.

- Prepare the specifications table and determine the relative weights based on the number of goals specified in the course.

2-Establishing a list of mathematical concepts, skills, and principles that students study in the study subject in the chosen unit.

3- The test items were formulated to cover all concepts, skills and principles contained in the content of the subject matter of the experiment

4- Building the test specification table according to the following:

Design a form containing unit lessons and educational goals formulated in each unit lesson with goals categorized according to Bloom's classification, and then present them to the arbitrators.

Below is a table listing the goals of the selected unit in its final form after presenting it to the arbitrators.

As the total number of educational goals in its final form has become a table of goals specifications (40) distributed across the first level (remembering) and the second level (understanding) and the third level (application) the fourth level (higher mental skills) according to Bloom's classification of educational goals and the following table shows that:

Table (2) specifications for the achievement test in the unit of relative numbers

sum	High mental skills	Application	Understanding	Know and remember	the level
40	5	10	20	5	Number of targets

Accordingly, 40 questions were formulated covering all objectives, and all tests came in the form of multiple choice

Validity of the test:

The test was initially presented to a number of arbitrators to verify the implications of the apparent honesty of the test using the veracity of the arbitrators,

and the arbitrators were selected from those with experience, the measurement in the measurement and the measurement in the measurement and measurement.

Determination of test time:

The test time was calculated by monitoring the time of each member of the survey sample for the test necessary to complete the test in full, then calculating the average time for all, and it was found that the appropriate time period to complete the test is (60 minutes) that includes the period of reading the instructions.

Stability test: To calculate the stability of the test, the researcher relied on the Alpha Cronbach coefficient, where the coefficient of stability reached 0.90, which is a good stability coefficient

Logical reasoning test preparation:

For the purpose of preparing the logical thinking test in mathematics for middle school students, the researcher follows the following steps:

Determining the goal of the test: The test aims to measure the logical thinking skills of the second intermediate grade students, after applying a strategy, reveal your papers to them in teaching mathematics.

Review literature and related studies

•Developing a list of logical thinking skills. The research adopted a list of skills developed by (Al-Hassani, 2015) due to its suitability for the age group of students (second intermediate class) and because it we measure logical thinking in mathematics in particular. These skills are:

-1Logical classification skill: arranging common things with the same quality in one group

-2Induction function: Track molecules in a conscious and organized way to reach colleges.

-3Devising skill: It means giving the student one or more leads to reach a result mentioned in that introduction or introductions.

-4Conclusion skill: It means giving the student one or more leads to reach a result that was not mentioned in that introduction or introductions. (Al-Hassani, 2015, 130(

•Test content: The test includes 30 questions divided to measure the four skills identified previously

The test link was taken into account.

•Correction of the test:

Two grades are calculated for each test item, and accordingly, the total test score becomes 60.

•Validity of the test:

To ensure the sincerity of the test was presented to a group of specialists in order to express their opinion on the integrity of the test items from a scientific and linguistic point of view, and to suggest adding, deleting or modifying any item, and accordingly the researcher reached the final image of the test.

Test stability: To ensure the reliability of the test, the alpha coefficient was used to find the internal consistency coefficient of the test, which had a value of 0.832, indicating the validity of the test as a measurement tool.

Statistical means: The researcher used the appropriate statistical means, which are the difficulty coefficient equation, the coefficient of distinction, the equation for the efficacy of wrong alternatives, the Koder Richardson equation (K-20), the Pearson equation, the Cooper equation and the Levin test for two independent samples and the t- test for two independent samples, And the effect size equation, as was the use of the statistical package spss

Chapter Four Search Results:

The search results will be displayed according to its hypotheses as follows:

Results of the first hypothesis, which states: "There is no statistically significant difference at the level of significance (0.05) between the average scores of students of the first experimental group that was studied according to the concept of link strategy

and the average scores of students of the control group that were studied according to the usual method of testing achievement in mathematics"

To verify the validity of the previous hypothesis, the academic achievement test was applied dimensionally to the study sample

Experimental and control, and calculating the value of (T) to identify the significance of the differences between the experimental and control group

In the achievement test, the value of (T) was calculated to identify the significance of the differences between the tribal measurement

The dimension of the experimental group in the achievement test is clear from the following tables

Table (3)

The value of (T) and the level of the statistical significance of the differences between the first experimental group and the control group in the achievement test in mathematics.

Statistical significance	Significance level	Degree of freedom	**Test value (T)**		standard deviation	SMA	**No.**	the number	the group
				Tabular					
Function	Function	0.05	84	1.990	7.3938	41.326	**18**	18	The first pilot
					7.0927	34.275	**18**	18	Control

It is clear from the data of the previous table that there are statistically significant differences at the level (0.05) between the mean scores of the experimental group that were studied according to the concept of linkages and control strategy in the post measurement of the achievement test in mathematics for the benefit of the first experimental group, where the value of (T (calculated 4,495)) It is greater than the

value of the table (T), whose value is (1.990), which means that the hypothesis is not accepted and confirms the high level of academic achievement among the members of the experimental group. For the statistical significance in the light of the values of (v) and the degree of freedom, illustrated the results of the size of the effect in the following table:

Table (4) The effect of concept linking strategies on the achievement of intermediate second-grade students in mathematics

Effect size level	ETA square η 2	T value	Degree of freedom	Effectiveness
Large	0.94	20.1	29	The interior
Large	0.66	10.012	58	External

It is clear from the previous table that the effect size value associated with the ETA squared value has a significant effect, which confirms the effectiveness of the concept link strategy in raising the level of mathematical achievement among middle school students

The results of the second hypothesis of the research and its text: There are no statistically significant differences at the level of significance (0.05) between the averages of the degrees of the first experimental group that were studied by applying the concept of concept linkages and the control group strategy that was studied in the usual way in the logical thinking test for the second intermediate grade students

To verify the validity of the previous hypothesis, the logical reasoning test was applied after the first experimental group that was studied according to the concept of concept and control group strategy, which was studied according to the usual method, and calculating the value of (T) to identify the significance of the differences between the experimental group and the control in the test, and a value was also calculated (T) To know the significance of the differences between the pre and post measurement of the experimental **group in the same test, this is evident from the following tables:**

Table (5) the value of (T) and the level of the statistical significance of the differences between the first experimental group and the control group in the logical reasoning test

Statistical significance	Significance level	Degree of freedom	**T value**		standard deviation	SMA	the number	the group
				Tabular				
sign	Function	0.05	85	2.1	7.23	40.9	18	Experimental
					7.09	34	18	Control

By looking at the data of the previous table, there are statistically significant differences at the level of significance (0.05) between the mean scores of the first experimental group that was studied according to the concept of linkages and control strategy in the dimensional measurement of the logical thinking test in favor of the experimental group, where the calculated T value reached (4.4) which is A value greater than the scheduled T value which is (2.1), which means rejecting the hypothesis, which indicates the development of mathematical logical thinking among the average second grade students from the experimental group who were proposed the strategy.

To find out the effectiveness of the concept bonds strategy on logical thinking in mathematics for the study sample, the formula for the effect size of the directive supplementing the statistical significance was applied, in light of the values of **(T) and the degree of freedom, and the results of the effect size are shown in the following table:**

Table (6) the magnitude of the effects of the concept link strategy on logical thinking

Effect size	Value of d	Value of η2	Dependent variable	Independent variable
very big	1.088	0.191	Logical thinking	Concept Links Strategy

Looking at Table (6) it can be seen that the value of η2 is (0.191) and the value of d is (1.088), which means that the effect size is very large, which indicates that the independent variable (concept link strategy) has an effect on the dependent variable (logical thinking) It has great effectiveness on the first experimental group that was studied according to the strategy.

The results of the third hypothesis and its text: There are no statistically significant differences at the level of significance (0.05) between the averages of the degrees of the second experimental group that have been studied by applying the confrontational strategy (reveal your papers) and the control group that studied in the usual way in the mathematical achievement test for middle second grade students.

To verify the validity of the previous hypothesis, the mathematical achievement test was applied after the second experimental group and the control group, and the value of (T) was calculated to identify the significance of the differences between the second experimental group and between the control group in the achievement test, and the value of (T) was also calculated to identify the significance of the differences between The pre and post measurement of the second experimental group in the test is evident from the following tables:

Table (7) the value of (T) and the level of the statistical significance of the differences between the second experimental group and the control group in the mathematical achievement test

Statistical significance	Significance level	Degree of freedom	T value		standard deviation	SMA	the number	the group
			Degree of freedom	Tabular				
Function	Function	0.05	Degree of freedom	1.97	6.99	42	18	Experimental
					6.3	33	18	Contro

By looking at the data of the previous table, there are statistically significant differences at the level of significance (0.05) between the mean scores of the second experimental group that was studied according to the confrontational strategy (reveal your papers) and the control in the post measurement of the achievement test in mathematics for the benefit of the experimental group, where the calculated T value (3.89) It is a value greater than the scheduled T value, which has a value of (1.97), which means rejecting the hypothesis, which indicates an increase in the achievement of the average second grade students in mathematics from members of the experimental group who have been proposed the proposed strategy to them.

Statistical differences also indicate the effectiveness of the proposed strategy. Detect your papers significantly on the achievement of the second intermediate-grade students in mathematics.

The results of the fourth hypothesis of the research and its text: "There is no statistically significant difference at the level of significance (0.05) between the average scores of students of the second experimental group that was studied according to the strategy of revealing your papers (confrontation) and the average scores of students of the control group that were studied according to the usual way in the logical thinking test, and to verify From the validity of the previous hypothesis, the logical thinking test was applied dimensionally to the second experimental and controlled study sample, and the value of (T) was

calculated to identify the significance of the differences between the experimental group and the control in the logical thinking test, and the value of (T) was calculated to identify the significance of the differences between the measurement The pre and post experimental group in the test is evident from the following tables:

Table (6)

Statistical significance	Significance level	Degree of freedom	**T value**		standard deviation	SMA	the number	the group
				Tabular				
Function	Function	0.05	85	2.3	8.1	44.1	18	Experimental
					7.9	35.6	18	Control

By looking at the data of the previous table, there are statistically significant differences at the level of significance (0.05) between the mean scores of the experimental group and the control in the dimensional measurement of the logical reasoning test in favor of the experimental group, where the calculated T value reached (5.1) which is a value greater than the T-value that is scheduled Its value is (2.3), that is, the hypothesis is not accepted, which indicates the development of mathematical logical thinking among middle school students from the experimental group who were proposed the strategy.

To ensure the effectiveness of the concept and participatory link strategy (reveal your papers) on logical thinking in mathematics for the study sample, a formula was applied to the effect size of the direct complementary to the statistical significance, in light of the values of (T) and the degree of freedom, and the results of the effect size are shown in the following table:

Table (7) The effect of the strategy of revealing your papers on developing logical thinking among middle school students:

Effect size level	T value	T value	Degree of freedom	Effectiveness
Large	20.96	20.96	29	The interior
Large	10.012	10.012	58	External

The data from the previous table shows the high value of the effect size associated with the value of the ETA square, which confirms the effectiveness of the confrontational strategy (reveal your papers) in developing logical thinking among students.

Interpretation of the results:

a. Results related to the achievement variable in mathematics:

The results related to the mathematical achievement variable and shown in the previous tables showed the superiority of the experimental group that was studied according to the concepts of concept and confrontation strategies (uncover your times) in the achievement test in mathematics compared to the scores of students of the experimental group who studied in the traditional way, which confirms the effectiveness of the proposed strategies in increasing mathematical achievement in Middle second-graders, the researcher attributes this to the **following reasons**:

•Many educational research and studies confirm the positive and effective impact of cooperative and active learning methods and strategies in teaching mathematics

•The strategy of revealing your papers facilitates the role of the teacher and transforms the role of the student from just a recipient component to a positive participant in the class, which is reflected in his activity and his enthusiasm towards learning and thus the acquisition of concepts, laws and others.

•The steps in applying your disclosure strategy, which includes immediate peer feedback, reveals each individual's papers in front of the other and from the teacher as well to enhance learning and raise the level of achievement among students.

•The concept of link strategy activates students' thinking and helps them remember their previous ideas and link them to the new concept, which facilitates the acquisition of the new concept and its branches of topics and it includes elements.

C- Results related to the logical reasoning variable.

The results of the statistical analysis indicated the superiority of the experimental group that was studied according to the strategies of concept and confrontation links (reveal your expectations) in the logical thinking test in mathematics compared to the scores of students of the experimental group who studied in the traditional way and this is shown in the previous table presented, which indicates the effectiveness of the proposed strategies in developing Logical thinking among middle school students, the researcher attributes this to the following reasons:

•Employing the strategy (reveal your papers) with its interesting and thought-provoking activities with its steps and stages helps students to walk according to logical, logical thinking.

•Teaching leads according to a strategy and confrontation (reveal your papers) and what it includes from activities to develop logical thinking skills: classification, conclusion, extrapolation and deduction

•Previous studies, including the Friday 2006 study, indicate that there is a strong relationship between raising the level of mathematical achievement for students and developing their logical thinking.

•Concept Bonds strategy works to improve visual intelligence and link concepts and ideas and helps students present their ideas, which is positively reflected in the development of their logical thinking skills.

W- Conclusions:

In light of the results of the research, several conclusions were reached, including the following:

-1Both the concept link strategy and confrontational strategy (reveal your papers) are effective strategies with a positive positive impact in raising the level of mathematical achievement among students.

-2Strategies also have a positive and effective impact on developing students' logical thinking skills

-3There is a direct relationship between academic achievement and logical thinking for students in mathematics.

-4The design of mathematical lessons, according to the concept of link strategy, led to the creation of a positive, stimulating and highly educational atmosphere, which was reflected in the students 'learning and eliminated the difficulty of the mathematics subject prevailing among students.

-5Teaching according to active learning strategies, especially the strategy of revealing your papers, helps in enhancing mathematics learning in general and works to raise students' achievement of mathematical laws quickly and easily.

C- Recommendations

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

-1Applying modern strategies such as concept linking and confrontational strategies in teaching mathematics, especially for basic (primary - intermediate) stages of education, for its effectiveness in acquiring mathematical concepts and raising students' achievement of the laws and principles of mathematics.

-2The necessity of changing the educational strategies followed by teachers, and adopting modern strategies and global trends in teaching mathematics to keep pace with the global educational development.

-3The necessity to move away from traditional teaching methods and strive to activate the role of the student and involve him in the educational learning process, as this has a positive impact on student learning.

-4Holding workshops and training courses for teachers on the latest strategies used to teach mathematics, including the strategy (reveal your papers) and the concept link strategy.

-5The necessity of clarifying the difference between the mind mapping strategy and the concept link strategy.

-6The necessity of reviewing the curricula and curricula of mathematics to ensure that lessons and courses can be adapted according to modern teaching strategies.

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