The Effect of Using the (KUD) Strategy in Solving Mathematical Problems for Primary School Students

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Abstract
The aim of the research is to identify the effect of using the (K U D) strategy in solving mathematical problems among primary school students, and in order to achieve the goal of the research, the following null hypothesis was developed:
There is no statistically significant difference at the significance level (0.05) between the mean scores of the experimental group students who will study mathematics according to the (KUD) strategy and the scores of the control group students who will study the same subject according to the usual method in the test of solving mathematical problems.
The research sample consisted of (67) female students of the fifth grade of primary school in (Sheikh Maarouf Elementary School) for the academic year (2020-2021), distributed into two groups, one of them experimental and studied according to the (KUD) strategy, with (34) female students and the other control, which were studied according to the usual method by (33) students.
The two groups were rewarded in the variables (chronological age calculated in months, intelligence, academic achievement of the parents, previous knowledge in mathematics, and previous achievement in mathematics), as the research tool represented by (the test of solving mathematical problems) was built.
The test of solving mathematical problems consisted of (16) objective items, and the validity of the test was verified, and the reliability coefficient was acceptable, as the KewderRichasson _20 equation was used to find it (0.85).
After the end of the experiment, the test of solving mathematical problems was applied to each of the two groups (experimental and control), and using the appropriate statistical means, the results showed a statistically significant difference between the experimental and control groups in the test of solving mathematical problems in favor of the experimental group.
In light of the research results, the researcher presented some recommendations and suggestions for the purpose of conducting subsequent research and studies.

Introduction

First: The research problem:

The world is witnessing remarkable progress in all different areas of life, and the field of teaching is one of these areas and has received great progress and interest, as mathematics enters into all areas of life, even in its small and large parts, so no science is devoid of mathematics concepts, facts and laws.

Therefore, the objectives of mathematics education have evolved from a mere focus on accuracy and speed in performing arithmetic operations to a focus on understanding and

the ability to solve mathematical problems (problems), which represent one of the main objectives of mathematics education, and teaching methods and strategies are among the most important variables that have an effective role in learning mathematics. And this is what educational institutions have emphasized, as the mathematical problem and methods of solving and analyzing it have occupied workers in the field of mathematics teaching and those who are interested in it and its methods of teaching for a long time until our time, as educators believe that the ability to solve a mathematical problem is one of the most important skills that an individual must master, as the solution to the problem is directly related to the scientific method (the method of solving problems).

Some believe that the mathematical problem in the primary stage is easy and quick to solve for the teacher, but it is difficult and not easy for the student, as the goal of solving the mathematical problem is not only to reach an answer to the problem, but more importantly for students to train to use the steps of the solution in a proper use and encouragement.

The teacher teaches the students to think about the solution by retrieving what they have learned with the information of the new problem given to them and then linking the data and the elements of the problem and what is required so that they have the ability to solve on their own. On previous Iraqi studies, such as the study (Hassoun, 2017) and the study (Yahya, 2013), I found that there is weakness among students in solving mathematical problems.

Therefore, it was necessary to search for modern teaching strategies, including the KUD strategy, which may lead to an increase in their ability to solve the mathematical problem.

Second: The importance of research:

1. In response to scientific and technological progress in the world in general and in the field of mathematics in particular, which emphasizes the use of modern strategies in teaching mathematics. The KUD strategy is one of the modern strategies that make the student the focus of the educational process

2.Trying to find out new methods of teaching mathematics that contribute to raising the level of students in solving mathematical problems in general, and primary school students in particular.

3.The KUD strategy employs scientific knowledge to face life problems and take appropriate decisions.

4.The importance of solving mathematical problems as one of the components of the mathematical structure.

5.Attempting to improve the level of mathematics for the better through the use of modern teaching strategies, including the (KUD) strategy.

Third:The Objective:

(The research aims to identify the effect of the (KUD) strategy in solving mathematical problems for primary school students).

Fourth: The Hypothesis:

There is no statistically significant difference at the significance level (0.05) between the mean scores of the experimental group students who will study mathematics according to the KUD strategy and the scores of the control group students who will

study the same subject according to the usual method in the test of mathematical problems.

Fifth: The limits of the research:
The research is limited to:
The second semester of the academic year 2021 _ 2020 AD, and the students of the fifth grade of primary school in the government primary schools of the General Directorate of Education in Baghdad / Karkh I for the academic year (2021 _ 2020) AD.,within three chapters of the mathematics book to be taught to the students of the fifth grade, the first part and the first edition for the year 2019 AD).
Sixth: Define terms
1.Strategy (KUD) (Know, Understand, DO)
 Define it (2001, Tomlinson) as:
An educational strategy consisting of three stages (Know, Understand, Do) based on determining what the learner knows and providing a variety of activities to build meaning for the learner, and apply the concepts learned in the subject of the lesson. (Tomlinson, 2001: 22).
The researcher defines it procedurally: It is an educational strategy represented in three stages, which consists of (know, understand, act) that the researcher uses in teaching the experimental group students of mathematics, as it centers around the role of the fifth grade students and works to meet their diverse needs and interests.
2.Solving Mathematical Problems: Problem Solving
 Define it (Al-Sharif, 1996) as: "The activity that the student performs when trying to link the relationship between the previous information and the data of the issue and his progress in the steps towards the planned goal, which is the desired end result from the data in the issue." (Al-Sharif, 1996: 87).
1.The researcher defines procedural problem solving as: It is a new mathematical situation to which the students of the research sample are exposed and requires them to achieve the goal to be accomplished, and it is measured by the degrees they obtain by answering the paragraphs of the mathematical problem solving test prepared for this purpose.

Theoretical Background and Previous Studies

First: The (KUD) strategy

This strategy is among the structural theory strategies that received a great deal of attention and development by Dr. Carol Ann Tomlinson, a professor in educational leadership participating in the Curry College of Education at the University of Virginia in 1999 AD) to know the learning outcomes that the student should achieve, Before the teacher begins to teach students any of the units of the curriculum assigned to them, he needs to know what they will learn during this unit of study, (Tomlinson, 2001:1). This strategy enables the teacher to divide the lesson objectives into different levels of knowledge, skill and effectiveness that suit each student, and aims to raise the level of all learners based on previous experiences and individual characteristics.
He needs to know what the student will learn during this unit. This strategy consists of three steps: What I want the student to know it, what I want the student to understand,

and what I want the student to apply during the lesson. (Tomlinson, 2005: 16). The KUD strategy is defined in three phases:

The first stage: (K) means (Know)

The learner needs to know (concepts, information, facts, people, definitions, principles, vocabulary, rules, and places). Knowledge is a revolution in the learner's understanding and learning and transforming the learner from a marginal passive individual to an active, active, active individual. Knowledge is also a door of study. And research to understand the learner's learning methods, processing and organizing information.

The second stage: (U) means (Understand)

The learner understands the basic facts (ideas, generalities, principles, rules) within a specific field of knowledge or a specific subject. Without knowledge, the student cannot exercise the higher mental abilities of application, analysis, installation and evaluation.

The third stage: (D) which means (Do) meaning (to apply or to work):

The learner performs basic skills such as (thinking, planning, reading, using numbers, communication, and production), and we also mean the use of abstractions in new situations, (2005:56) and (Tomlinson, 2001:33).

Second: Solving the Mathematical Problem:

Not all mathematical problems are direct or in a regular sequence, some are regular, some are complex, and others have not been solved so far, as there are dozens of strategies that develop students' ability to solve the mathematical problem, and each strategy has specific steps, some Strategies are more appropriate than others in solving a specific mathematical problem, and here lies the teacher's skill in choosing these strategies, as well as alerting students that mathematical problems are not an end in themselves but a method of learning and thinking, through which we learn more and reach mathematical generalizations and conclusions, which encourage us to apply The principles that we learned in new situations, (Abu Asaad, 2010: 185).

The researcher adopts the strategy of (George Polia) in the test of solving mathematical problems for a number of reasons, the most important of which are:

1.This strategy has been applied in the field of mathematics and proven effective.

2.That this strategy has simple and easy main stages, and it is easy to train teachers on it, and apply it to students. (Al-Sadiq, 2001).

Apulia strategic steps:

A) Understanding the problem: If the issue is presented in a clear and understandable language that matches the level of the students, the teacher must ensure that the students understand the issue by asking the learners and asking them:

 Reformulate the issue in the language of the students.

What are the facts in the matter? Is it sufficient?

 What needs to be found? Is there extra information?

 Draw an illustration of the problem.

b) Preparing a solution plan: The teacher's role in this step is to present some questions to the students that will help them come up with the idea of the solution, and the teacher asks his students in this step:

 Organizing the given information in a way that shows the interrelationship between them.

Linking the issue to a related previous issue.
 Choosing an appropriate solution plan.
C) Implementation of the solution plan: This step is considered the easiest step of the solution steps, if he understands it correctly, and has the necessary skill to do so. The teacher asks the students:
 Use the solution plan.
Choosing an alternative solution plan if the first plan does not work.
d) Review of the solution: The correctness of the solution is verified by several methods, including, by taking the steps of the solution in reverse, or by verifying the answer by substitution, or by resorting to other solving methods,(Abu Zina, 2011: 292-293).

Previous Studies

Table (1) Previous studies dealing with the (KUD) strategy and solving mathematical problems

Results	Statistical means	Depend-ent variable	search tools	stage &the size and gender of the sample	Curri-culum of the study stage	Purpose of the study	Name of the researcher year and place of study	**Seq.**
There is a statistically significant difference between the two research groups and in favor of the experimental group in the inferential thinking scale	Alpha-Cronbach equation Kewder_Richardson equation _20 (t_test)	Inferential thinking	A measure of deductive reasoning	Students of the fifth biological sciences (75) Students divided into two groups: experimental (38) students and control (37) students was adopted	experimental	Recognizing the effect of the KUD strategy on the inferential thinking of the fifth scientific (biological) students of chemistry	Hussein 2019 Iraq	**(1**

There is a statistically significant difference between the experimental group that studied according to the KUD strategy over the control group that studied according to the usual method in the achievement test in computer subject and in favor of the experimental group	t-test for two independent samples	Computer subject matter	Preparing an achievement test	middle school students (60) Students divided into two groups: experimental (30) students and control (30) students	experimental	Recognizing the impact of the KUD strategy on the achievement of first-intermediate students in computer subject	Muhammad, 2019 Iraq	**(2**
There is a difference between the mean scores of the experimental and control group students in favor of the experimental group in the test of solving mathematical problems as a whole and in each of its skills	t-test for two independent samples	solving mathematical problems	solving mathematical problems test	fifth-grade students (58) Students divided into two groups: experimental (30) students and control (28) students	experimental	To identify the effect of teaching using the SCAMPER strategy on solving mathematical problems for fifth-grade students and t-test for two independent samples. Each of his skills	Al-Jubouri 2017	**(3**
_- There is a statistically significant difference between the scores of the study group in the test of the four mathematical problem solving skills, which are:)Understanding the issue, developing a solution plan, implementing the	Pearson Correlation Coefficient and Cronbach's alpha coefficient &The half-segmentati	problem solving skills	a test of mathematical problem	for fourth-grade students Pupils divided into two groups: experimental (15) students and control (15) students	experimental	To identify the effect of employing a proposed after-school program on developing mathematical problem-solving skills among low-achieving	Abu Shehab 2001 Palestine	**(4**

solution plan, ensuring the correctness of the solution) for the benefit of the post application , _There is an effective effect of employing the after-school program on the development of mathematical problem solving skills according to the strength of the effect (η2 = 0.549) among the low-achieving fourth grade students in the schools of the Gaza Strip.	on method to test hypotheses T-test for related samples To ensure the effectiveness of the program Eta square					fourth-grade students in Gaza Strip schools		

Research Methodology and Procedures:

The researcher followed the experimental method, because it is appropriate to achieve the goal of the research and because it is one of the closest approaches to solving problems in a scientific way, and it is known as "a controlled and deliberate change of the specific conditions of the phenomenon that is the subject of the study, and the observation of the effects of that change in that phenomenon." (Al-Dahrawi, 2011: 109).

First, the experimental design:

One of the semi-experimental designs with partial control for two equal groups with a post-test was chosen to solve mathematical problems in mathematics, as it is suitable for the nature and conditions of the current research and an attempt to provide accuracy in the results as shown in the following table:

Table (2) the experimental design of the research sample

the research tool	the dependent variable	the independent variable	equivalence variables	group
Math problem solving test	solving math problems	Strategy (KUD)	chronological age in months_ IQ test_ Previous achievement in _ mathematics	Experimental

		the usual way	A test of prior knowledge in _ mathematics The educational attainment of _ the parents	Control

Second: The research community and its sample:

The research community represents all the students of the fifth grade of primary school in the morning primary schools for girls, which are affiliated with the General Directorate of Education in Baghdad / Karkh I for the academic year 2021_2020 AD. The experimental group that studies according to the (KUD) strategy has reached the number of its students (34), and the (B) division represents the control group that studies according to the usual method, and the number of its students has reached (33) students.

Third: search procedures

The two research groups were rewarded in the variables (chronological age in months, intelligence, prior knowledge in mathematics, previous achievement in mathematics, and parents' academic achievement).

Table (3)

The results of the T-test for two independent samples of the students of the two research groups in the variables (chronological age in months, intelligence, previous knowledge in mathematics, previous achievement).

Stati-stical sig.	(t_test)value		Freedom degree	Standard deviation	Statistical mean	Sample size	group	variable
	Sig. level	Calcu-lated						
Non-sig.	0.717	0.36	65	7.600	127.941	34	Experi-mental	Chrono-logical age
				8.034	128.636	33	control	
Non-sig.	0.818	0.23	65	4.788	18.529	34	Experi-mental	Intelli-gence
				4.259	18.273	33	control	
Non-sig.	0.344	0.954	65	2.546	11.9412	34	Experi-mental	previous knowledge
				2.373	12.515	33	control	
Non-sig.	0.734	0.34	65	1.466	7.824	34	Experi-mental	previous achievement
				1.571	7.697	33	control	

Statistical sig.	Degree of freedom	Value of Ki Square		group	variable	parents' academic achievement
		sig. level	X^2			
Non-sig.	2	0.924	0.158	Experi-	father	

				mental control		
Non-sig.	2	0.230	2.935	Experi-mental control	mother	

Fourth: Controlling the extraneous variables:

1-Accidents accompanying the experience:

It means the events that one of the experiment members (the research sample) may be exposed to during the duration of the experiment, which could impede the course of the experiment, or may affect the dependent variable, which is solving mathematical problems), and during this period the experiment members were not exposed to any significant accidents that affect the dependent variable is next to the independent variable.

2-Experimental extinction:

During the course of the experiment, the experiment was not subjected to interruption, leaving or transferring any of the students of the two research groups (experimental and control).

3-Processes related to the maturity of the sample members:

It means the gross (biological), mental or psychological changes that may occur to the individuals of the experiment (the research sample) during the period of its conduct. There was no effect of these factors, because the students of the two research groups (experimental and control) are of almost an age level, so the occurrence of any growth related to the physical (biological), mental or psychological aspect, this growth is equal for almost all members of the experiment, and for this, the two research groups (experimental) and control) are equivalent in this respect.

4-The effect of the experimental procedures:

In order to protect the experiment, the researcher tried as much as possible to reduce some of the side effects that may have an impact on obstructing the course of the experiment, including:

 Confidentiality of the experiment: The researcher was keen to keep the research experience confidential, in agreement with the school administration and the subject teacher, not to inform the students about the nature and purpose of the research, so that the student's activity or interaction with the experiment would not change.

 Subject teacher: The researcher studied the two research groups (experimental and control) electronically by herself throughout the duration of the experiment, in order to avoid the difference that arises as a result of the difference of teachers in their ability and personal traits such as their activity, desire or motivation in teaching the subject or other factors, and this adds to the experience a degree of Accuracy and objectivity.

 Study subject: The researcher studied the three chapters of the mathematics book for the fifth primary grade, first edition, for the year 2019 AD, which are (the sixth: operations on regular and decimal fractions, the seventh: denominators and multiples,

and the eighth: geometry) in an equal manner, to ensure the equality of the mathematical information that exposed to the students.

 Duration: The time duration of the research experiment was uniform and equal for the students of the two research groups (experimental and control), as it started on Sunday (4/25/2021AD), and ended on Thursday, corresponding to 17/6/2021AD.

 Place of the experiment: The experiment was applied to the two research groups (experimental and control) electronically on a group of fifth-grade primary schoolgirls at (Sheikh Maarouf Elementary School for Girls).

 Measurement tools (research tool): This variable was adjusted through the application of the research tool to the students of the two groups (experimental and control), which is represented in the test of solving mathematical problems.

 Distribution of lessons electronically: This factor was set during the researcher's agreement with the school administration to prepare the weekly electronic lesson schedule at the rate of one class per day, that is, five classes per week, and in the event of an official holiday, it is compensated with an additional lesson to complete the scheduled curriculum.

Fifth: Research requirements:

1-Determining the learning material: The researcher identified the learning material represented by the three chapters, namely (sixth, seventh, and eighth) from the content of the mathematics book for the fifth grade of primary school, the first edition of the year 2019.

2-Analysis of the academic content: The researcher analyzed the academic content according to the components of mathematical knowledge (concepts, generalizations, skills, problem solving).

3-Formulation of behavioral objectives: The behavioral objectives were derived from the general objectives of teaching mathematics for the fifth grade of primary school and the teacher's guide book for the fifth grade of primary school for mathematics and analyzing the content of the learning material within the scope of the experiment. At three levels: (memory, comprehension, and application), it was presented to a number of arbitrators and specialists in the methods of teaching mathematics.

4-Preparing teaching plans: Teaching plans were prepared for each of the two research groups (experimental and control), in light of the objectives, and a sample of them was presented to arbitrators and specialists in the field of mathematics and its teaching methods.

Sixth: The test tool:

 Determine the purpose of the test:

The idea of defining the goal of the test is to know the extent to which the fifth grade students are able to solve mathematical problems.

 Determining the learning material:

The content of the scientific material was determined for the two research groups (experimental and control), represented by the three chapters: (sixth: operations on regular and decimal fractions, seventh: denominators and multiples, and eighth: geometry) from the mathematics textbook for the fifth grade of primary school.

Drafting test items:

Based on the opinion of the arbitrators, the paragraphs of the test of solving mathematical problems were prepared in the form of objective paragraphs of the type (multiple choice), as (16) test paragraphs were formulated, taking into account their coverage of the educational material and behavioral objectives.

Drafting test instructions:

A page has been prepared in the introduction to the test that includes the instructions for the test directed to the students, explaining the nature of the test, its purpose and how to answer it, taking into account reading each paragraph carefully and focusing and not answering randomly or leaving any paragraph unanswered with an explanation that the answer is on the question paper.

Validity of test items and instructions:

After the researcher prepared the test and its instructions in its initial form, it was presented to a group of arbitrators, to explore their opinions about the validity of its paragraphs in measuring the content in the light of the behavioral objectives. In its final form (16) paragraphs, a model answer was prepared for the test paragraphs, and it was adopted in the correction, as the objective paragraphs were given one degree for the correct answer and zero for the wrong answer or left without an answer, and thus the total score for the test of solving mathematical problems became (16) degrees.

The exploratory application of the mathematical problem solving test:

a) First exploratory application (information sample):

The test of solving mathematical problems was applied electronically on Tuesday, corresponding to 06/15/2021 AD, on a sample of (30) female students from the fifth grade of primary school at (Al-Manahil Elementary) School of the General Directorate of Education in Baghdad / Karkh First, according to a book facilitating the task. Its aim:

1 -Verify the clarity of the test paragraphs and instructions.

2-Determining the time taken to answer all paragraphs of the test and it was found that all the paragraphs of the test of solving mathematical problems were clear.

The time taken to answer all the paragraphs for all the students was calculated by calculating all the response times for the students about the test and divided by their number, as the average time was (70) minutes, to be the time specified for the students to answer all the paragraphs of the test of solving mathematical problems.

It turned out that most of the paragraphs were clear.

B) The second exploratory application (statistical analysis sample):

After applying the test of solving mathematical problems electronically on the sample of information and making the appropriate adjustments to the test, the test is ready to be applied again, in order to conduct the statisticalanalyzes of the test paragraphs. Sirin Primary School) affiliated to the General Directorate of Education in Baghdad / Karkh First on Thursday, corresponding to 17/6/2021 AD, according to a letter facilitating the task, as it was agreed with the school administration to conduct it and inform the students seven days before the date of the application of the test.

Statistical analysis of test items:

Difficulty coefficient for math problem solving test items:

To check the difficulty of the paragraphs of the test of solving mathematical problems, the equation for finding the difficulty coefficient for the objective items was applied, and the value of the difficulty coefficient for the objective items ranged (0.33_0.56(

Discrimination coefficient for math problem solving test items:

To verify that all the test items are distinct, the discrimination coefficient for the objective items was calculated based on the equation for each of them. It was found that it ranges between (0.41-0.56) for the objective items, as the item is considered good and acceptable if its discrimination coefficient is (20%) or more.

The effectiveness of the wrong alternatives:

The effectiveness of the alternatives was found for the objective paragraphs, which ranged between (0.06 -_ 0.025 -), and it was shown that they attracted the students of the lower group more than the students of the higher group, and that all the alternatives are negative, which indicates the effectiveness of all the wrong alternatives.

Honesty

The validity of the math problem solving test was verified using the following types of validity:

1-Apparent honesty: The test is outwardly honest, if its title indicates the behavior to be measured

Abdul-Hadi, (123:2002), as the paragraphs of the test of solving mathematical problems were presented to a number of arbitrators in mathematics and its teaching methods, and it was accepted that the paragraphs that received an agreement rate of more than (84%) of the arbitrators' opinions, and thus the apparent honesty of the test verified.

2-Content validity: Content validity is one of the most valid types of honesty and it is intended to conduct an orderly examination of the total of stimuli and items included in the test to assess the extent to which they represent the behavioral domain. (Al-Azzawi, 2008: 93). To verify the validity of the test content, the researcher presented the test in its initial form, with a list of behavioral objectives and the content of the educational material, to a group of arbitrators in mathematics and its teaching methods. A-paragraph.

3-The validity of the construction: It is also called the validity of the hypothetical formation, and it indicates the extent of the relationship between the theoretical construction of the test or the scale and its paragraphs. (Abu Jadu, 2011: 400), and the internal consistency of the paragraphs was ascertained to test the solution of mathematical problems by finding the associative relationship.

 Correlation of the score of each item with the total score of the test:

The correlation coefficient was extracted between the scores of each item of the test and the scores of the total test using the Pearson Correlation Coefficient, and the results showed that all items were statistically significant, as the values of the correlation coefficient ranged between (0.21_ 0.42), and after extracting the t-values - in terms of the correlation coefficient with a degree of freedom (118) and at a significance level (0.05) - it became clear that all of them are higher than the tabular t-values of (1.960), which means that all paragraphs are kept, as shown in Table (3):**Table (3)**

The correlation coefficient of each paragraph of the math problem solving test with the overall test scores

Statis-tical sig.	**Sig. level**	**T-value**	**معامل الارتباط**	**Seq.**	Statis-tical sig.	**Sig. level**	**T-value**	correlation coefficient	**Seq.**
sig.	**0.003**	**2.3333**	**0.21**	**9**	**دالة**	**0.000**	**4.0589**	**0.35**	**1**
sig.	**0.001**	**3.1683**	**0.28**	**10**	**دالة**	**0.002**	**2.6855**	**0.24**	**2**
sig.	**0.002**	**2.5672**	**0.23**	**11**	**دالة**	**0.003**	**2.3333**	**0.21**	**3**
sig.	**0.003**	**2.3333**	**0.21**	**12**	**دالة**	**0.003**	**2.3333**	**0.21**	**4**
sig.	**0.000**	**5.0272**	**0.42**	**13**	**دالة**	**0.001**	**2.8048**	**0.25**	**5**
sig.	**0.003**	**2.3333**	**0.21**	**14**	**دالة**	**0.003**	**2.3333**	**0.21**	**6**
sig.	**0.001**	**3.2917**	**0.29**	**15**	**دالة**	**0.003**	**2.3333**	**0.21**	**7**
sig.	**0.003**	**2.3333**	**0.21**	**16**	**دالة**	**0.002**	**2.5672**	**0.23**	**8**

The stability of the test of solving mathematical problems:

To calculate the stability of the test, the equation (Kewder Richardson 20_) was used, which is used in calculating the stability of tests that include objective paragraphs.

The final test of solving mathematical problems:

After conducting the statistical analysis of the test items, the test for solving mathematical problems is ready in its final form and prepared for the final application, with a total score of (16) degrees.

Seventh: Procedures for applying the experiment: The researcher followed the following procedures in applying the experiment:

Application of equivalencies: The application of equivalence between the two research groups (experimental and control), which is represented in: (intelligence test, previous knowledge test in mathematics, chronological age, previous academic achievement in mathematics, and parents' academic achievement) was started.

Application of the experiment: The experiment was applied in the second semester of the academic year (2021_2020 AD), as it started on Sunday (25/4/2021 AD), and ended on Sunday (06/21/2021 AD), and the researcher herself studied the experimental and control groups electronically via the platform. (Telegram), as the experimental group, Division (C) was studied based on the steps of the (KUD) strategy, which consists of three steps, starting with (knowledge and ending with action), and the control group, Division (B), based on the usual method, with (5) lessons per week for each group, and according to the teaching plans prepared by the researcher for each of them.

Application of the research tool: After the completion of teaching the students the academic content scheduled within the scope of the experiment, they applied the test of solving

mathematical problems: the test was applied in its final form electronically, supplemented at the same time on the two research groups (experimental and control) on Monday corresponding to 06/21/2021 AD. Then the researcher corrected the answers, and thus obtained the raw scores for the students of the two research groups (experimental and control) in (the test of solving mathematical problems).

Eighth: Statistical Means

After collecting the data, the statistical program (SPSS) for Social Sciences (SPSS-26) was used to process the data statistically, reach the results, and use the appropriate statistical means for research.

Presentation and interpretation of the results:

The first axis: Presentation of the results of the test of solving mathematical problems:

For the purpose of verifying the null hypothesis which states that: (There is no statistically significant difference at the significance level (0.05) between the mean scores of the experimental group students who studied mathematics according to the KUD strategy and the scores of the control group students who studied the same subject according to The usual method in the test of solving mathematical problems), the test of solving mathematical problems was applied, and the total score was calculated for each of the two research groups (experimental and control), as the statistical program (SPSS) was used to obtain a statistical description of the raw data for the two research groups (experimental and control), Table (4) shows that the mean scores of the experimental group students are (12.706) with a standard deviation of (1.767), while the average scores of the control group students are (9.9697) with a standard deviation of (1.9281).

By applying the (Levene's Test) test for two independent samples, to find out the significance of the difference between the varying degrees of the students of the two research groups (experimental and control), the value of (F) reached (0.015) at the significance level (0.902), which is greater than the approved significance level (0.05), and this means that the two groups are homogeneous in this variable.

In order to find out the significance of the difference between the mean scores of the students of the two research groups (experimental and control), a (t_test) test was applied for two independent samples. 65), and this indicates the superiority of the students of the experimental group who were taught according to the (KUD) strategy over the students of the control group who were taught according to the usual method in the test of solving mathematical problems.

The stability of the test of solving mathematical problems: To calculate the stability of the test, an equation (Table 4) was used

Sig. level (0،05)	t-test value		**Freedom degree**	Levene's test for homogeneity of variance		**Stand-ard deviation**	**Statistical mean**	**number**	group
	Sig.level	**calculated**							
Sig.	**0.000**	**6.058**	**65**	**Sig.level**	**F-Value**	**1.767**	**12.706**	**34**	**experimental**
				0.902	**0.015**				
				assuming equal differences		**1.928**	**9.970**	**33**	**control**

According to the results, the null hypothesis is rejected, which states that (there is a statistically significant difference at the significance level (0.05) between the mean scores of the experimental group students who studied mathematics according to the KUD strategy and the scores of the control group students who studied the same subject according to the usual method in Mathematical problem solving test) in favor of the experimental group.

Second: Interpretation of the results

(1The three stages of the KUD strategy are organized and sequential, which enables the students to receive the scientific material in the least time. In addition, it distances the students from the learning style that depends on memorization and indoctrination and focuses on stimulating the minds of the students to think about the mathematical problem and reach the appropriate solution for it. Thus, it increases the level of their ability to solve mathematical problems.

(2The students of the experimental group were able to positively interact during the step (understand) with the content of the material they are learning because they did not get the knowledge ready-made, as in the usual way for the control group, as well as work in small groups to provide them with the opportunity to exchange experiences, which led to the creation of an atmosphere My education may be the reason for raising the level of students in solving mathematical problems for the benefit of the experimental group.

(3Teaching according to this strategy and the sequence in its steps helped the students to link the previous information with the new information through a step that is known, which is the first stage of the strategy stages, which leads to understanding and realizing the steps of solving the mathematical problem.

Third: Conclusions

According to the results of the current research, the researcher reached the following conclusions:

1-Adopting the (KUD) strategy in teaching mathematics for the fifth grade of primary school has an impact on raising the academic level in mathematics and solving mathematical problems.

2-The (KUD) strategy makes the student a main focus in the learning process.

Fourth: Recommendations

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

1-Encouraging the necessity of teaching mathematics with the (KUD) strategy for all academic levels as it leads to an increase in their ability to solve the mathematical problem.

2-Conducting in-service training courses for mathematics teachers on the application of the (KUD) strategy and how to employ it in teaching mathematics

3-The necessity for the female and male teachers of mathematics, before starting to explain the lesson, to be aware of the previous knowledge related to the topic of the lesson among the students.

4-Directing the attention of mathematics teachers not to be limited to traditional methods of teaching and the necessity of adopting modern strategies that make female students the focus of the educational process and a positive participant in it, including the (KUD) strategy.

Fifth: Suggestions

To complete this research, the researcher suggests the following:

1-Conducting a comparative study between the effect of the (KUD) strategy and other strategies to find out the extent of its impact on solving mathematical problems.

2-Conducting a study of this strategy on other dependent variables such as logical thinking, developing reflective thinking, and acquiring mathematical concepts.

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