The Effect of Using the Loop Succession Strategy on Acquiring Mathematical Concepts among

Fifth Grade Pupils

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Abstract

  The present study aimed to know the effect of using the loop succession strategy on acquiring mathematical concepts among fifth grade pupils. The study sample consisted of (63) pupils from the fifth grade of primary school, and distributed randomly into two groups, one experimental with (31) pupils, and the other controlling the number of (32) pupils, and the experimental design with two equal groups and the post test was used. Where a test was prepared to acquire mathematical concepts according to three levels, namely (concept definition, concept distinction, and concept application) consisting of (24) objective paragraphs of the type (multiple choice) with four alternatives.

   The research includes (8) main mathematical concepts and the consistency is calculated via using the KeoderRichardson equation 20 (K - R20) and the results were treated through using the t-test equation for two independent samples, and they showed a statistically significant difference at the level of significance (0.05) between the mean scores of the two groups (experimental and control) in an acquisition test for mathematical concepts **.**

Introduction :

 Truly, given the advantage of mathematics as a cumulative, constructive nature in its topics and its abstraction in concepts, relationships, and facts, is a complex field of knowledge in relation to meaningful learning, and its learning raises many problems and difficulties in front of learners.

Mathematical concepts are one of the problems that guide researchers in the field of teaching and learning of mathematics, and Al-Kubaisi, (2008) indicated that one of the reasons behind the unsatisfactory image of mathematics is the way it is taught to learners, because the use of teaching methods in our schools still emphasizes the theoretical aspects based on memorization and indoctrination instead of thinking, creativity and innovation, so it appears as an artificial thing that has nothing to do with it. In fact, this is what made it difficult for the learner (Al-Kubaisi, 2008: 26).

  As these methods underestimate the learner and make him a passive dependent learner waiting for his turn to participate in the times set by the teacher according to what he sees, and this leads the learner to suppress his talent and extinguish his creative flame (Al-Sulaiti, 2008: 7) .

  Despite the continuous development in teaching strategies, many teachers in educational institutions use traditional methods in their teaching, and perhaps one of the reasons for this is their lack of knowledge of modern teaching strategies, and their inability to apply them (Abdulaziz et al., 2017).

The Study of Problem:

  An open survey questionnaire was prepared on the teaching methods used in mathematics, and the extent to which pupils acquire mathematical concepts in mathematics for the fifth grade of primary school, and it was distributed to a random sample of mathematics teachers for the fifth grade of primary school distributed among several schools of the General Directorate of Education Baghdad / Rusafa II , And they have experience in the field of education (not less than five years), and their number reached (18) teachers, and after reviewing the answers to male and female teachers, the following is revealed:

-Most of the teachers assert that they do not use modern teaching methods and methods, because there are reasons, including:

-The large number of learners in the classroom, the lack of appropriate educational means, and the lack of time for the lesson .

-The presence of a decline in the level of achievement in mathematics, which may be due primarily to their lack of acquisition of mathematical concepts .

Therefore, the two researchers decided to use one of the active learning strategies (the loop succession strategy) to address this problem.

In light of the above, the problem of the current study is formulated in answer to the current question:

Does the use of the loop succession strategy have an effect on acquiring mathematical concepts for fifth grade pupils?

The Importance of the Study:

The importance of the current study stems from the following.

1-The study is the first of its kind that investigated the effect of the loop succession strategy on the acquisition of mathematical concepts in Iraq (as far as the researchers know).

2-The loop succession strategy provides many opportunities for the learner to self-grow and learn according to his individual abilities.

3-The process of acquiring mathematical concepts for the learner is important as it is the basic building block for the components of mathematical knowledge .

4-The primary stage is an essential stage in the life of Pupils. The success of mathematics education and their learning at this stage affects the success of the subsequent educational stages.

Purpose of the Study:

The current study aims to identify the effect of using the loop succession strategy in acquiring mathematical concepts among fifth grade pupils.

Study Hypothesis :

"There is no statistically significant difference at a significance level (0.05) between the mean scores of the experimental group (who study according to the annular succession strategy) and the control group (who study according to the usual method) in the mathematical concepts acquisition test".

The limits of the Study:

•Primary school pupils of the Baghdad Education Directorate, Al-Rusafa / The Second.

•Topics of the mathematics book for the fifth grade of elementary school T1, 2019 represented by chapters (large numbers, large numbers addition and subtraction, number multiplication, number division).

• The first semester of the academic year (2020-2021).

Defining terms:

1-The loop succession strategy: it is defined procedurally as a strategy of active cooperative learning strategies followed by the teacher in teaching the topics covered by teaching the experimental group organized procedural steps, represented in dividing Pupils into groups of four or five and distributing a worksheet to each group in order to write questions and answers to them He posed a hyperbolic question that includes several answers, then each student writes the answers to them, passes them to his colleague in the group, and then discusses the pupils ' answers and their ideas with the teacher .

2-Acquisition of mathematical concepts: it is signified technically, which is the ability of Pupils to define the concept and distinguish it between

examples belonging to the concept, examples not belonging to the concept, application of the concept in new mathematical and life situations, and measured by the test (prepared by the researcher for this purpose).

Theoretical Framework and Previous Studies

Introduction :

Constructivist theory is one of the most important modern educational trends that are widely welcomed and increasingly interested in educational thought and contemporary teaching, which focus on the fact that learning is an active and continuous process (Al-Jiddi, 2012: 12).

The constructivist theory is based on the idea of (teaching for the sake of understanding), and the learner is considered the center of the teaching process, meaning that constructive teaching is based on the principle of (the learner is active and positive), and that the teacher is a coach, a leader and a guide for learning processes (Al-Atwani, 2012: 20).

The loop sequence strategy represents one of the active cooperative learning strategies, which have great importance in the process of (teaching and learning), as this strategy is used to encourage learners to brainstorm their ideas through a huge amount of learners' answers, because of the hyperbolic questions presented to them (It has several answers), and the importance of using the (loop succession strategy) appears from working with it in the form of small cooperative groups in the classroom.

The decrease in the participation of each learner in the discussion may result on an equal basis with others and this is due to the existence of individual differences between the learners, and it may lead to the existence of Learners who are alone in discussion, and others listen without motivating them to participate in the presentation of their ideas and activities, and this does not mean that the group of listeners agree to

Present their ideas, view and comments, so the loop succession strategy contributes to overcoming these obstacles, and it becomes a task in overcoming and marginalizing some learners (Knight, 2009): 21).

Just as the importance of (the loop succession strategy) is to allow the group to advance to the decision-making step, and their ability to solve problems, and give them sufficient time to think, and this helps to choose the individual differences in a proper way, and that every learner should look at him, on the basis that he is a source of importance for producing ideas and opinions for others.

Kagan (2009) believes that it is one of the active cooperative learning strategies, where the teacher divides the learners into small groups, then presents them with a question to refine ideas, the question may be written, pictorial or oral, and in which all learners are encouraged to answer without neglecting any learner within the group, as this strategy (loop succession) is characterized by the great interaction between the learners (Kagan, 2009: 5-3(.

Steps to Implement the Loop Succession Strategy:

This strategy can be implemented through the following steps:-

1-The teacher divides the pupils into groups of four or five .

2-The teacher presents a hyperbolic question (which has several answers) for each group, and each pupil must answer part of the question when it is his turn, aloud .

3- Pass one sheet of paper to the pupils in each group to write their answers on it .

4-The role can return to the first pupil in order to complete the episode and also to complete the solution of the question in the specified time (knight 2009: 12).
5-Each pupil must listen to the answers of his colleagues so that he does not repeat them again.

6- pupils continue writing the answers until the question is answered.

7-The teacher discusses the groups 'answers (Embu Saidi & Hoda 2016: 548).

Acquire Mathematical Concepts:

The process of acquiring mathematical concepts starts from childhood and is based on sensory perception and the child's observation of the things, events and people surrounding him (Saleh, 2006: 48) .

This is why the process of acquiring mathematical concepts is one of the main goals that educators work to achieve, through different educational situations (Al-Jubouri, 2001: 2), because the acquisition of concepts is a major part of the teaching and learning process in the classroom (Abu Zina, 2001: 139).

The process of acquiring concepts is based on sensory perception and observation, as teaching and learning and discrimination play an important role in the acquisition process (Saleh, 2006: 85).

As indicated by Darwaza (1995), we can make sure of the occurrence of the process of acquiring concepts, through the question that tests the student's ability to:

-Defining the mathematical concept in writing and verbally when its name is mentioned, or it is required to mention the name of the concept in writing, or verbally when the definition is given to it .

-Determine the semantics of the mathematical concept .

-Applying the mathematical concept to new and varied situations.

-Give an explanation of the observations and observations in the environment based on the learned mathematical concepts .

-Use mathematical concepts to solve problems .

-The use of mathematical concepts in inferences, generalizations, or various scientific hypotheses (Hamdan, 2005: 98).

Brunner also believes that the process of acquiring mathematical concepts is achieved by collecting the learner's examples that indicate that concept and classifying it, leading it to arrive at the concept. He also mentions that the process of acquiring concepts is a stage that follows the process of forming the concept (Qatami 1989: 266).

It means, when the initial understanding of the subject of the lesson ends, the learner becomes acquainted with the concept, or the set of basic concepts, that the subject contains (Hamdan, 2005: 97).

Bruner explained the process of acquiring the concept from among two learning processes: the process (selection and reception) in which the first examples are unclassified, so the learner chooses one of them, and investigates whether it is an example belonging to, or not, belonging to the concept. The teacher's examples in a specific order are classified and described by positive examples, or negative examples (Qatami, 1989: 173).

Previous Studies :

The first axis: studies related to the toroidal succession strategy .

 •The study (Tayas-Lolita, 2014) that was conducted in Indonesia aimed to uncover the extent of the impact of the application of the ringing debate strategy on teaching reading comprehension among Pupils of the eighth grade basic, as the sample size reached (40) pupils for the experimental and control group, and the study concluded the clear effect of the strategy of the thorny debate in learning reading comprehension .

-The study (Al-Azzawi, 2018) that was conducted in Al-Iraq aimed to reveal the extent of the impact of the ringbased debate strategy on achievement in the social subject of fifth-grade Pupils, and the sample size was (63) pupils for the experimental and control group, and the study concluded the clear effect of the ring debate strategy on Attainment .

-As for the study (Al-Sabawi, 2020), which was conducted in Al-Iraq to reveal the extent of the impact of the ring debate strategy on the acquisition of Islamic concepts among the fifth-grade literary Pupils, Islamic concepts and the development of their moral values.

Second Transfer

Pupils related to the acquisition of mathematical concepts.

-The study (Al-Bayati, 2010) that was conducted in Iraq aimed to find out the effect of using the Clausmeyer model on the acquisition of mathematical concepts among fifth-grade primary Pupils. The study sample consisted of (63) male and female pupils in the primary stage, and the study concluded the clear effect on the acquisition and retention of mathematical concepts .

•As for the study (Lama, 2013) that was conducted in Iraq to know the effect of using thinking maps on the acquisition and retention of mathematical concepts of fifth grade primary Pupils, and the size of the study sample reached (53) primary school pupils, and the study concluded a clear effect on the acquisition and retention of mathematical concepts.

•As for the study (Muhannad, 2014) that was conducted in Iraq to know the effect of classroom questions on the acquisition of mathematical concepts among middle school Pupils and their critical thinking skill, the size of the study sample reached (85) middle school pupils.

Mathematical and critical thinking skills development.

•Whereas, the study (Al-Karkhi, 2016) conducted in Iraq showed to know the effect of teaching according to the Stipans model and its effect

on the acquisition of mathematical concepts among fifth-grade female Pupils, and the sample size was (55) primary school pupils, and the study concluded the clear effect of the Stipans model and its effect on the acquisition Mathematical concepts.

•The study (Well-being, 2019) that was conducted in Iraq examined the effect of Perry and Keren's model in acquiring and retaining concepts among first-grade Pupils in the middle school subject in mathematics, the size of the study reached (70) middle school pupils, and the study concluded that there is an effect of Perry and Keren's model In the acquisition and retention of mathematical concepts in mathematics.

Study of Methodology and Procedures

Methodology of the study: - The experimental design with two equal groups and the post test was relied on, as shown in the following chart:

The experimental design scheme adopted in the study

Test	Dependent variable	Independent variable	Equivalence	Group
A Test of the Acquisition of Mathematical Concepts	Acquisition of Mathematical Concepts	Loop Succession Strategy	Experimental Chronological Age for Intelligence	Experimental
		the Usual Way		Control

The current study population consists of fifth grade pupils who study in elementary day schools for boys affiliated to the General Directorate of Education in Baghdad / Rusafa

The second for the academic year (2020-2021) and the approval of the Directorate were obtained to facilitate the task of studying to conduct the experiment in one of its affiliated schools. The school (Al-Ibdaa Elementary for Boys) was chosen intentionally to represent the study sample, and it was found that the school includes four classes for the fifth grade of primary school and their number was (126) Pupils. The number of the study sample, after excluding those who fail, reached (63) Pupils distributed among (31) experimental and (32) control officers. The equivalence of the two study groups in the extraneous variables was verified and the results were shown in the table .

Table (1) results of the t-test of parity of the two study groups

level of Sig.	Degree of freedom	T value		Standard deviation	Arithmetic mean	No. of membe-rs of the sample	Group	Variables
		tabular	Compute-d					
Not Sig.	61	2.00	0.56	1.44	7.84	31	Empirical	Previous achievement
				1.31	8.03	32	Control	
Not Sig.	61	2.00	0.58	1.77	10.58	31	Empirical	prior knowledge
				2.32	10.63	32	Control	
Not Sig.	61	2.00	0.93	5.38	30.77	31	Empirical	intelligence
				6.05	29.44	32	Control	
Not Sig.	61	2.00	11.11	1.80	19.65	31	empirical	Acquisition of experimental mathematica-l concepts
				1.34	15.22	32	Control	
Not Sig.	61	2.00	0.188	2.642	111.87	31	Empirical	The age of the experimental
				2.806	112.00	32	Control	

Study Supplements :

The scientific material that will be taught to the Pupils of the study sample is determined, and it is the fourth semester of the mathematics book for the fifth grade of primary school for the academic year (2020-2021).

The behavioral objectives were formulated based on the content of the educational material for the content of mathematics, and their number reached (162) behavioral objectives, according to Bloom's classification in the cognitive domain and for the six levels (remembering, comprehension, application, analysis, synthesis, evaluation), and were presented to a group of experts Specialists in methods of teaching mathematics to express their opinions regarding its clarity, formulation, and its suitability for cognitive levels .

The teaching plans were prepared according to the (loop succession strategy) for the experimental group, and the other according to the usual method for the control group. Two model plans were presented to a number of arbitrators .

Acquisition of mathematical concepts test:-

The test aims in this study to measure the effect of the independent variable of the Toroidal succession strategy on the acquisition of mathematical concepts among the fifth grade pupils .

After the researcher has seen many studies, and through the procedural definition adopted by the researcher, a test (acquisition of mathematical concepts) was prepared, and the researcher committed to measuring the levels of each of the pre-defined mathematical concepts, namely: (defining the mathematical concept, distinguishing its examples from not, and applying examples In a variety of sports situations).

The test items consisting of (24) objective items (multiple choice) were prepared, where the principle of consensus was taken in the opinion of experts as a criterion for the validity of the paragraphs.

- To verify the validity of the test, the researchers used:-

A-   **The apparent honesty:** The test items are presented to a number of experts in methods of teaching mathematics, to know the extent of clarity and suitability of the paragraphs to measure the hypothesis for which they were developed .

B-   **Validity of the structure:** The validity of the test construction was verified by extracting the difficulty factor, discrimination, and the effectiveness of false alternatives for each of the test items.

Formulation of test instructions:

- **Test Instructions:** The two researchers formulated instructions for answering the (acquisition of mathematical concepts) test.

- **The model answer for the test:** The two researchers developed the model answer for all the test items .

-The exploratory sample:

A-   Time calculation sample and test instructions: one of the researchers calculated the time taken to answer the test on an exploratory sample consisting of (20) pupils s, and the response time for the first (5) pupils and the last (5) pupils was recorded, and the time taken for the answer which reached (35) was calculated Accurate, and the test instructions were clear and the paragraphs were understandable to the pupils .

B-   The sample for analyzing the test items: one of the researchers analyzed the test items on an exploratory sample consisting of (100) pupils (other than the study sample), and the answer sheets were

corrected and then arranged in descending order, the upper (27%) and the lower (27%) were selected for the analysis of the items. The test is as shown:-

-The difficulty factor was calculated for each of the test items, and the difficulty coefficients ranged for the objective items, and found them ranging between (0.35 - 0.68).

-Discrimination coefficient was calculated for each of the test items, and discrimination coefficients for the items ranged between (0.32 - 0.79).

-The effectiveness of the wrong alternatives was calculated for each paragraph using the corresponding equation from the test items, so it was found that the effectiveness of the wrong alternatives are all negative and thus it was decided to keep the alternatives as they are without change .

-The test consists in the final version of (24) paragraphs of the objective paragraphs of the type (multiple choice), and after confirming the statistical analysis of its paragraphs and the validity and reliability of the test, and the test is ready for application on 2/10/2021 .

Presentation and Interpretation of Results :

-For the purpose of verifying the null hypothesis, which states that "there is no statistically significant difference at a level of significance (0.05) between the mean of the experimental group (those who study mathematics according to the circular succession strategy) and the average scores of the control group (those who study the same subject in the traditional way) In the acquisition of mathematical concepts test.

To verify the validity of this hypothesis, a t-test was used for two independent samples to reveal the significance of the difference between the average performance of the experimental and control groups, and the results are shown as follows:-

Table (2) the results of the t-test to find out the significance of the difference between the mean scores of the two research groups in the acquisition of mathematical concepts test .

Statistical significance at) 0,05(the level	T-value		degree of freedom	standard deviation	arithmetic mean	Sample size	Group
	Tabular	Computed					
Statistical significance	**2,00**	**11,11**	**61**	**1,80**	**19,65**	**31**	Empirical
				1,34	**15,22**	**32**	control

This indicates the existence of a statistically significant difference between the mean scores of the experimental group Pupils and the scores of the control group Pupils in the test (acquisition of mathematical concepts) and thus rejects the null hypothesis and accepts the alternative hypothesis, meaning that: "There is a statistically significant difference at a level of significance (0.05) between the mean scores of the group's Pupils. Experimental (those who study mathematics according to the Toroidal succession strategy) and the average scores of the control group (those who study the same subject in the traditional way) in the acquisition of mathematical concepts test.

The size of the effect was calculated for the annular succession strategy in acquiring mathematical concepts, and Table (3) illustrates this .

Table (3) the size of the effect of the Toroidal succession strategy in the concept acquisition test by (Ita square) and the value of (d).

Effect size	value of (d)	The square of Ita	Value of T. Computed	The variable
Large	1,44	0,67	11,11	Acquisition of mathematical concepts

After applying the Ita square equation to reveal the size of the effect of the toroidal succession strategy in acquiring mathematical concepts, I found that the value of the Ita square was equal to (0.67), and the value of (d) was equal to (1.44), and when compared with the standard values shown in Table (4), It was found that the size of the effect of the variable of acquisition of mathematical concepts is large, and as in the following table:

Table (4) the reference for determining the levels of impact size according to the three classifications in the psychological and educational sciences

large	medium	small	The standard
0,14	0,06	0,01	Eta square
0,80	0,40	0,20	value of (d)

Research Article

Interpretation of the result:

The results indicated that there is a statistically significant difference at the level of significance (0.05) between the mean scores of the two groups (experimental and control) and in favor of the experimental group in the mathematical concepts acquisition test, and the researchers attribute the reason for the acquisition of mathematical concepts among Pupils of the experimental group, from the fact that the succession strategy AlHaliki worked to attract Pupils' attention and increased their focus and thinking, and showed the nature of mathematical concepts and the relationship of these concepts to each other

Conclusions:

In light of the results of the study, the following can be concluded:

-The existence of a positive effect of the cycle succession strategy on the acquisition of mathematical concepts for fifth grade pupils.

-The size of the effect of the Toroidal succession strategy in acquiring mathematical concepts was large.

Recommendations and proposals:

In light of the results of the current study, the researchers recommend the following:

-The necessity of using the cycle succession strategy in teaching mathematics to fifth grade pupils, due to its effect on acquiring mathematical concepts .

-To complete and develop this study, the two researchers suggest conducting the study for the following: -Conducting a study to identify the effectiveness of the loop succession strategy in the achievement of fifthgrade pupils in mathematics and the development of their lateral or contemplative thinking.

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