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Teaching mathematics according to the Collins and Stephens model and its impact on the acquisition of mathematical concepts among fifth grade primary

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Abstract: The current research aims to identify (teaching mathematics according to the Collins and Stephens model and its impact on the acquisition of mathematical concepts among fifth grade primary school students and the development of their social values) The researcher adopted the experimental design with partial control, as it suits the nature of the research, the researcher made sure before starting the experiment that the students of the two research groups are statistically equivalent in a number of variables that he believes may affect the integrity of the experiment, and these variables are: (The researcher adopted two tests to measure the variables of his research. The first test was the Mathematical Concepts Acquisition Test, the final version of which consisted of (39) paragraphs and verified its validity, stability and discrimination, as well as the statistical analysis of its paragraphs, and the researcher prepared the Social Values Scale, the final version of which consisted of (33) paragraphs and verified its validity, stability and discrimination, and the results showed the superiority of the experimental group over the

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control group in the Mathematical Concepts Acquisition Test and the Social Values Scale.

Keywords: Collins and Stephens' model, acquisition of mathematical concepts, social values.

Chapter I: Introduction to the research

Research objectives:

The current research aims to identify:

- The impact of the Collins and Stephens model on the acquisition of mathematical concepts among fifth grade primary school students.
- The impact of the Collins and Stephens model on the development of social values among fifth grade primary school students.

Research hypotheses:

In light of the research objectives, the researcher formulated the following null hypotheses:

1. There is no statistically significant difference at the significance level (0.05) between the average scores of the students of the experimental group who study mathematics with the Collins and Stephens model and the average scores of the students of the control group who study the same subject in the usual way in the test of the acquisition of mathematical concepts.
2. There is no statistically significant difference at the significance level (0.05) between the average scores of the students of the experimental group studying mathematics with the Collins and Stevens model and the average scores of the students of the control group studying the same subject in the usual way in the social values scale.
3. There is no statistically significant difference at the significance level (0.05) between the average scores of the students of the experimental group studying mathematics with the Collins and Stevens model in the pre and post social values scale.

Research limits:

The research is limited by the following:

1. **Human limits**: Fifth grade female elementary school students.
2. **Spatial** boundaries: Primary schools affiliated with Nineveh Governorate Education.
3. **Temporal boundary:** The academic year 2023-2024.
4. **Thematic boundaries:** The first three semesters of the physical education course to be taught to fifth grade students.

Defining terms:

- Impact is defined by Al-Quash (2004) as: The amount of change caused by the teaching method is represented in the cognitive learning outcomes of students and is measured by recognizing the amount of increase or decrease in their grade point averages (Al-Quash, 2004: 17).

- Collins and Stephens model: - Al-Dualism (2008) defined it as a kind of investigative dialogue between students themselves and between the teacher and his students and according to some strategies used by Collins and Stephens in their theory to help students reach scientific knowledge and active integration in understanding and enjoying the scientific material and solving the issues they face during the lesson **.**(Al-Dualism, 2008:294-319).

- (Collins and Stephens procedural): It is defined as one of the teaching models based on the constructivist inquiry theory, which provides learners with the opportunity for dialog, discussion, exploration and work to develop their intellectual skills.

- **Conceptualization is defined by Al-Azirjawi:** "Helping students to collect examples of the concept and categorize it **in** a way that enables them to reach the desired concept" (Al-Azirjawi, 1991: 140).

- **Social values**: Defined by **(Barak, 2015):** They are "values that concern the individual and society and through which the individual feels social awareness, trusts himself and the community, feels comfortable and secure, works for the group, complies with the orders of this group and maintains its customs and traditions, and through them determines the ties

of the group and is considered a distinct group (Barak, 2015: 10).

- The procedural definition of social values is: The set of principles, ideas, and intentional actions performed by fourth grade female students in different social situations and is measured by the score obtained by fifth grade primary school students in the scale prepared for this purpose.

Chapter Two Theoretical background and previous studies

The first section is a theoretical background: -

The concept of the Collins and Stephens model:

The model or the subject of this study was derived from Collins and Stevens' theory of investigative education, as it represented investigative dialogue in order to form principles or concepts previously known to the student or form concepts not previously known to the student, and during the dialogue, the teacher tries to encourage students to ask questions for the purpose of acquiring various intellectual skills (**Collin Stevens)**. The types of intellectual skills that the student learns in this process are : Forming predictions, forming and testing hypotheses, choosing optimal test cases for a theory, generating counterexamples, taking alternative hypotheses, knowing the formulas that rules and theories take, knowing what questions should be asked, and so on, in addition to the strategies that were mentioned in that theory, in short, all thinking skills in this educational model The investigative dialogue takes place between the students themselves and between the teacher and his students according to some strategies used by Collins and Stephens in their theory, taking into account the organization of organizational content in line with educational goals and behavioral objectives. (276-79)

Strategies of the Collins and Stephens model

One of the theories that dealt with the study of **inquiry** as an organized mental activity that tends to reach an understanding of scientific knowledge is the theory (Collins and Stevens), which is a cognitive theory of **inquiry** learning called**(Aconite Theory of Inquiry Teaching.**) **(Collins & Stevens** 1977) Its importance is evident in the fact that it studied different cases of the effectiveness of active teachers who use inquiry in their

teaching. According to **Collins Stevens**, teachers typically pursue different objectives simultaneously, and all of these objectives are linked with a set of strategies for selecting cases, asking questions, and giving comments. **Collins** states that teachers of inquiry learning have three goals:

A. Helping students form previously developed principles or theories.

b. Helping students form previously unknown principles or theories.

C. Teach students how to ask questions for the purpose of acquiring self-directed skills. The strategies developed by **(Collins Stevens)** that inquiry teachers use to accomplish and achieve the goals they want to achieve: -

- Selection **of** examples and non-examples
- **Variety of** cases in an orderly fashion
- Selection **of** contrasting (opposite) examples
- **Generating** hypothetical situations
- **Forming** hypotheses
- **Studying** educational alternatives**.**
- **Confronting** the learner with a problem
- **Reliability of** questioning

Collins believes that a good teacher is the one who uses investigative teaching with other teaching methods to help students learn and understand the study material and then learn the skills of solving various questions by their own efforts, as inquiry teaching techniques are designed to teach students how to build rules and theories by taking certain cases and then applying the rules and theories to new cases, through which the student learns two important things, namely:

- Specific theories about a field of knowledge.
- Diverse intellectual skills. (Youssef Qatari, 2015: 60)

Characteristics of the Collins and Stephens model:

1. It is usually a reflective cognitive process.
2. It can be individualized and can also be group-based.
3. The model includes the transition from the beginning of the issue to the goal and exploration phase.

4. The Collins and Stephens model requires structured steps in inquiry and exploration.
5. It requires the learner's desire and motivation to reach the goal.
6. The Collins model requires specific strategies depending on the type of question to be investigated.
7. The model is influenced by the learner's abilities and prior knowledge (Stemberg 1994:94).

Steps of teaching according to the Collins and Stephens model: - -

1. Begin the process of motivating and arousing students' motivation towards learning and preparing them for learning processes.
2. Divide students into small groups (4-6) fluid and exploratory groups.
3. Divide the groups into two sections: Casual and exploratory groups, so if the classroom consists of 6 groups, divide (3 casual groups and 3 exploratory groups)
4. Prepare contradictory events so that the correct scientific explanation can be reached through a scientific dialog based on questions starting with (do, what).
5. The teacher prepares a worksheet to be given to each exploring group to prove the conclusions they reach.
6. The teacher plays the role of the model and the students are the explorers and ask until they reach the correct explanation through a series of yes or no questions.
7. After the completion of the class, comprehensive cumulative tests are applied to students to determine the level of mastery they have reached.(Al-Bawl and Al-Samara, 2020: 90)

Second: Acquisition of concepts:

Students' acquisition of concepts is essential for understanding the basics of knowledge on the one hand, and increasing the ability to self-learn on the other hand, by organizing, simplifying and giving them a specific name for similar things, which makes them interact with knowledge with some consistency because they will deal with objects, situations, events and processes with common characteristics as members of a single class. Ellis, 1972: 13)).

The acquisition of concepts by the learner is associated with mental activities of understanding, interpreting events and applying them in relation to the effects of previously stored data in memory, with activities of organization and storage in a new memory of knowledge, and its association with intentional choices and directions, in addition to being related to the extent of the individual's potential in intelligence, the higher the level of intelligence, the higher the learner's ability to store information and then produce new knowledge in a continuous, good and continuous manner (Zaire and Dahl, 2015: 152), and it is related to the extent of the individual's potential in intelligence, the higher the level of intelligence, the higher the learner's ability to store the information and then produce the new in a continuous, good and continuous manner (Zaire and Dahl, 2015: 152).

In order to train students to use the concept accurately, the teacher must do the following:

1. Emphasize the basic features of the concept, and highlight them to students through examples that belong.
2. Use the appropriate method to teach the concepts.
3. Clarify the nature of the target concept and provide students with detailed examples in a proper sequence.
4. Motivate students to acquire the desired concepts that are meaningful to them.
5. Provide students with meaningful feedback that facilitates their progress toward the planned concepts.
6. Providing sufficient opportunities for students to use the new concept after reaching it (acquisition) (Qatari, 2017: 158).

As for concept formation, educators differed in the stages of concept formation, Bruner argued that concept formation goes through three basic stages, namely: -

1. The practical stage: It is called the sensory work stage, and while the formation of the concept is based on practical human interaction with the environment, the learner uses his senses to reveal the characteristics of the sensed material and learns concepts by associating them with actions or actions performed by himself, and by the extent of the number of situations to

which the learner is exposed, his conceptual circle expands about things (Sade and Al-Youssef, 2020: **66)**.

2. Iconic stage: The concept formation process rises from direct sensory dependence to the type of visual or semi-sensory abstraction, and this stage is based on the previous stage, but it rises in its intellectual and cognitive complexity.

3. Symbolic representation stage: It is called the abstract stage and while symbols replace motor actions and focus on previous experiences, here the learner is able to obtain and store knowledge, and can recall and recall it at any time. (Al-Saran, 2002: 196**).**

Third: Social values:

The reality is that there is no man who wears what he likes and does not behave as he should on the pattern he chooses, but he is in all of this restricted by the customs, values, standards, norms, orders and prohibitions of society, although in theory the individual is free in his choices and judgments, the reality is that the individual's choice of his type of behavior is largely restricted by the environment in which he grew up, the values he embraces, and the society in which he lives (Thai, 1999: 51).

Social values are always evolving and changing, but it is noted that the development and change of a person's social values require a readiness for this; and even if this readiness is found, the need for capabilities that help this development and this change is a vital necessity; that is, the presence of readiness with the absence of capabilities is useless, and we can say that the opposite is true." (Owes, 2016: 5)

However, it does not mean that social values are evolving or changing as a law to which all values are subject, there are values that do not change or evolve, but carry the characteristic of constancy and continuity, such as values derived from God's law, which carry categorical connotations such as parental righteousness, humility and mercy...

Social values derived from God's law have goals that they seek to achieve, including

A- Raising Muslims to love and cooperate with others

B- Raising Muslims to assume individual responsibility in society.

C- Instilling human values such as understanding and cooperation with other societies. (Bark, 2019:290)

D- Correcting all forms of social deviation through the social ostracism of individuals who violate the values of their society; which leads to the preservation of social order, as it is one of the most important factors that work on the cohesion and stability of society.

Social values are of great importance to society, as they are one of the most prominent factors affecting the cohesion, cohesion and unification of society, so that they constitute a basic pillar in the formation of human relations in societies, as they are considered an important factor in the process of social interaction between individuals in the same society and between the group and other groups; because social values are models that people prefer and desire as part of their culture and guide their behavior, and values influence the minds of the emerging generation during socialization, whether in the family or other educational institutions, thus performing their function in controlling the behavior of members of society, so that they become a strong pillar of the social order.

Characteristics of social values:

There is no doubt that human behavior, desires, inclinations, inclinations, interests and values are affected and change according to temporal and spatial conditions, and there is no exception to this except the absolute values that are from the Lord of the Worlds, such as covenant fulfillment, justice and compassion ... These are the ones in which there is no jihad, while those in which there is no text are relative and subject to jihad or consensus to approve them.

The most important characteristics of values can be identified as follows:

1. **Subjectivity of values:** The subjectivity of values appears through the individual's personal sense of values in a special way, as man, as a rational being, carries these values and imposes them on people. As Amara Matter argues, "Values do not exist independently of human feeling. A beautiful thing, for example, cannot be defined by any objective qualities, but its

measure is the human feeling and emotion about it." (Bahia, 2019: 15).

2. **Relativity of values:** The relativity of values means that their meaning is not determined or clear by looking at them and judging them in themselves abstract from everything, but rather they must be seen through the environment in which they arise and judged not an absolute judgment, but a circumstantial and situational judgment, by attributing them to the standards set by the particular society at a particular time, and by always returning them to the circumstances surrounding the culture of the people. (Dab, 1999: 64)

3. **Knowledge of values is prior:** Knowledge of values does not come suddenly and without pillars and bases from which to start, as the realization of values needs conscience and emotions supported by a conscious mind that directs its compass to the straight path, and in this sense Ali Abu Al-Amin says: "But this does not mean dispensing with the mind and senses, but the mental realization must be accompanied by emotion and conscience, then it gains strength in guiding man, not just a guide, whatever it may be, whose importance is lost when the emotion ends or once the conscience is silent, as strong influences occupy the circle of conscience, and the mental area may impose a perceived truth, so man is activated by it and enters the circle before him, but remains not fully assured of it until he is sure and fully reassured of it." (Abu Al-Endean, 2020: 31) (Abu El-Endean, 2020: 31)

4. **Values are socialized:** They are formed through a social product; the individual learns, acquires, imbibes, gradually internalizes, and adds them to his frame of reference for behavior, and this is done through the process of socialization. But this does not mean that the values of the group are one and absolutely agreed upon, the point is that the values prevailing in society as a whole agree in their broad outlines, and differ in branches and details, and society tolerates the conflict of values prevailing in it as long as it is within certain limits, then fights the violator of the group's values, and when the value becomes a measure for the individual, it affects his behavior. (Snow, 2018: 19).

5. **Values are based on choice and selection:** Values are based on a basis of choice and preference for everything that is desirable, so it was one of the characteristics of values to arrange among them in a hierarchical order, so some values dominate or subordinate others. It is assumed that the individual in his life tries to achieve all his desires that he believes have values, but the nature of the circumstances that surround him prevents this, and there is often a conflict between values, so we find that he tries to subordinate them to each other, subjecting the least acceptable to people to the most acceptable" (Al-Mubarakfouri, 2018, 22-227).

6. **Values include consciousness, feeling and emotion:**

A value is not a value unless it meets three conditions, namely:

§ He has a consciousness that crystallizes around the existence of an object, idea, or person.

§ That this awareness belongs to him and concerns him

Studies on the Collins and Stephens model	
Researcher's name and year of study	Researcher's name and year of study
Al-Hassan Ibrahim Kazak Pharaoh (2015)	Al-Hassan Ibrahim Kazak Pharaoh (2015)
Place of study	Place of study
Teachers Training Institute, Baghdad - Karsh / Iraq - Baghdad	
Objective of the study	Objective of the study
To identify the effect of using the Collins and Stephens model in teaching science to second grade students at the Teacher Training Institute on the achievement and retention of biological concepts.	To identify the effect of using the Collins and Stephens model in teaching science to second grade students at the Teacher Training Institute on the achievement and retention of biological concepts.
Stage of study and subject	Stage of study and subject

Chapter Three Research Methodology and Procedures

This chapter includes the procedures adopted by the researcher to achieve the research objective and hypotheses, represented by the experimental design, defining the research community, selecting the research sample and equality of its groups, as well as preparing teaching plans and procedures for their application, preparing and adapting research tools, applying the experiment and adopting appropriate statistical methods to analyze the results, as follows:

First: Research methodology:

The researcher followed the experimental approach to achieve the research objectives.

Secondly: Experimental design: -

Experimental design is one of the basic methods when studying human phenomena in general, and the more the design is tight and appropriate to the phenomenon to be studied, the more successful the experimental research method succeeds in understanding and interpreting the phenomenon Therefore, it is a plan and a work program for how to carry out the experiment, i.e. planning the conditions and factors surrounding the phenomenon we study in a certain way, and then observing what happens (Dagwood and Abdurrahman, 1990: 250-256), so the researcher chose a partial experimental design with two equivalent experimental and control groups, to suit the circumstances of the current research.

The first experimental group is exposed to the independent variable, which is the Collins and Stephens model, while the second control group is exposed to the traditional or regular method of teaching, and they were randomly selected, and the experimental design can be illustrated in Figure (1).

Figure (1) Experimental design

Post-test	Dependent variable	Independent variable	Pre-test	Group
Mathematical Concepts Acquisition Test and the Social Values Scale	Acquisition of mathematical concepts Social values	Collins and Stephens model	Social Values Scale	Experimental
		The usual way		Control

1. **III: Identifying the research community: -**
2. 1- Research community **:**
3. The research community means all individuals who possess the same characteristics to be studied in a particular phenomenon, that is, the research community is all individuals or things that have specific observable characteristics, and these common characteristics are called the "community parameters". (Abu Hawaii, 2002: 44).
4. The research population consists of fifth grade primary school students in primary day schools in the center of Nineveh and affiliated with the Nineveh Governorate Directorate of Education for the academic year (2022-2023). 2023), where the number of students reached (1533) female students in the fifth grade, according to the statistics carried out by the Educational Planning Department at the General Directorate of Education in Nineveh Governorate.
5. 2- **Selecting the research sample:**
6. A sample is defined as: "a small part of the society that is specially tested to represent the society correctly, and through the sample you know the characteristics of the society you are studying and analyzing" (Al-Balata, 2008, 183).
7. The researcher intentionally chose (Al-Shook for Girls), one of the schools affiliated to the General Directorate of Education of Nineveh to apply his experiment, and found that it includes two divisions for the fifth primary grade, and by random method, the researcher chose Division A (to represent the experimental group), which will teach the Holy Qur'an and physical education according to (Collins and Stephens model), and Division (B) represented (the control group) that will teach the Holy Quran and physical education according to (the usual method), and the number of female students of the sample was (53) students, 27 students for the experimental group, and (26) students for the control group.
8. **Fourth: Equality of the two research groups:**

9. Before conducting the experiment, the researcher made sure that the students of the two research groups were statistically equivalent in some variables that the literature and previous studies indicated may affect the results of the experiment: The chronological age of the students calculated in months and the tribal social values scale.
10. **1. The chronological age of female students in months:**
11. The researcher used the t-test for two independent samples, in order to know the significance of the statistical difference between the experimental and control groups, the results showed that there was no statistically significant difference between the two research groups as shown in Table 1, which indicates that the two research groups are equivalent in this variable.

Table (1) shows the arithmetic mean, standard deviation, calculated and tabulated t-values for the chronological age scores

Significance 0,05	p-value		Degree of freedom	Standard deviation	Arithmetic mean	Number	Group
	tabular	Calculated					
Non-functional	2,00	0,40	59	3,95	99,8	30	Experimental
				3,64	100,08	31	Control

1. Social Values Scale scores:

The researcher conducted on the research sample before the start of the experiment the future thinking test in order to equalize between the two research groups in this test, and the researcher used the t-test for two independent samples and no statistically significant differences appeared between the two groups, so the experimental and control groups are considered equivalent in the tribal social values scale, as shown in Table (2).

Table (2) shows the arithmetic mean, standard deviation, calculated and tabulated t-values for the scores of the tribal social values scale

Significance 0,05	p-value		Degree of freedom	Standard deviation	Arithmetic mean	Number	Group
	tabular	Calculated					
Non-functional	2,00	0,791	59	7,361	66,851	30	Experimental
				7,00	68,441	31	Control

1. **V: Research requirements:**
2. **1. Determining the scientific subject:**
3. Before the start of the experiment, the researcher determined the scientific material that will be taught to the students of the research sample, which included topics from the mathematics subject for the academic year (2023/2024).
4. **2. Identifying Islamic concepts:**
5. Abstract mathematical concepts were identified from the two units mentioned above from the Holy Quran and mathematical education, the researcher presented all (13) mathematical concepts to a group of experts and specialists, and some appropriate amendments were made to a number of them.
6. **3. Derivation of behavioral objectives:**
7. The researcher prepared behavioral objectives in light of the main concepts he identified, which are within the first and second units of teaching mathematics for the fifth grade of primary school, and the number of (13) Islamic concepts, and since the concept acquisition processes are limited to three processes: (defining the concept, distinguishing the concept, and applying the concept)
8. The researcher formulated the (39) behavioral objectives for those main concepts, the corresponding concepts and the level of acquisition of each concept, they were presented to a

group of experts and specialists, and after analyzing the experts' questionnaires, the researcher modified some of the objectives.

9. **4. Preparation of teaching plans:**
10. The researcher prepared teaching plans in which he will teach during the experiment, according to the model of Collins and Stephens to teach the students of the experimental group, and according to the usual method of teaching the students of the control group. The researcher presented two models of these plans to a group of experts and specialists in mathematics, teaching methods, educational and psychological sciences, to explore their opinions, suggestions and observations, in order to improve the formulation of these plans, and make them sound and valid to ensure the success of the experiment, and in light of what the experts expressed, the necessary amendments were made to them and they became in their final form ready for implementation.
11. **Sixth: Research tools:**
12. The researcher will clarify the two research tools and each tool separately in order to achieve the desired objectives of the research and its hypotheses and required two tools: The Mathematical Concepts Test and the Social Values Scale, as follows: -
13. **1. Concepts Acquisition Test:**
14. The researcher worked on building an Islamic concepts acquisition test, due to the lack of a ready-made test, relying on the concepts and behavioral objectives that were identified, so the test was of the multiple choice type because it is one of the most objective tests in which the chances of guessing are greatly reduced, in addition to being more stable in the honesty of judgments, and economy of time, in addition to that this test is characterized by flexibility as it can be used in evaluating educational objectives from different cognitive levels. Accordingly, the researcher prepared the test consisting of (39) paragraphs, covering the material contained in the experiment, and took into account that each concept has three processes that

measure (level of definition, level of discrimination, and level of application) and consists of (39) paragraphs in the acquisition of mathematical concepts (13) concepts of the type of multiple choice, then the researcher applied the test on an exploratory sample of (100) female students from the same research community and after analyzing the results, the researcher extracted the discriminant power of the paragraphs as ranging between (0. 30 - 0.58). When the researcher used the method of internal consistency Alpha Cronbach to know the stability of the test, the stability coefficient reached (0.80), which is a good percentage, and thus the test was ready for application in its final form consisting of (39) paragraphs.

15. **1. Social Values Test:**
16. After the researcher reviewed many studies related to social values, the researcher prepared the wording of the test paragraphs on the basis that the paragraph should be short and express one idea that is open to one interpretation, and that it expresses an opinion rather than a fact, and that it should not use ambiguous and undefined issues, and that the content of the paragraph should be clear, straightforward, and direct, and that the paragraph and the alternatives it contains should be The content of the paragraph should be clear, explicit and direct, and the paragraph and the alternatives it contains should be representative of the daily life situations of the sample members.
17. According to these criteria, (30) paragraphs were formulated, and the researcher took into account in the formulation of these paragraphs the clarity of the paragraph and that the paragraph is short and carries one idea and the paragraph is fixed, as the researcher chose (3) alternatives for each paragraph and these alternatives have weights ranging from (1.2.3), the alternatives were as follows: Apply to a high degree and reach (3) marks, apply to a low degree (2) marks, do not apply to a high degree (2) marks, do not apply to a low degree (3) marks, and do not apply to a low

degree (2) marks). This is for the positive paragraphs, and the correction is reversed in the negative paragraphs. The researcher presented the scale to an exploratory sample of the research community consisting of (100) female students, and after correcting the scores, the data were processed, and the discrimination power was calculated for each paragraph of the test, and the researcher found that it ranges between (2,976 - 8,230), so all paragraphs are considered acceptable because the calculated t-values are greater than the tabular t-value of (2.00) at a significance level of (0.05) and a degree of freedom (52). 05) and degree of freedom (52). The researcher measured the stability of the scale by the internal consistency method (Cranach's alpha), which is one of the important methods in measuring stability, as the value of the stability coefficient amounted to (0. 83), this indicates that it is a good and acceptable stability factor, as tests are considered good when their stability factor is (0.65) and above.

18. **Sixth: Statistical methods**: The researcher used the following statistical methods: (Testate equation for two independent samples, k-square (Ka2), difficulty coefficient of the test items, discrimination coefficient of the test items, Pearson correlation coefficient, Cranach's alpha, **and** Richardson's Kidder equation**.**
19. **Chapter Four: Presentation and interpretation of the results of the study**
20. This chapter includes a presentation of the research results reached by the researcher after the statistical processing of the data, an interpretation of the results of the research, and the most prominent conclusions, recommendations and proposals that the researcher reached from the verification of the following research hypotheses:
21. **I: Presentation of results:**
22. **1- Presentation of the result related to the first hypothesis :**There is no statistically significant difference at the significance level (0.05) between the average scores of the students of the experimental group who study mathematics with the Collins and Stevens model and the

average scores of the students of the control group who study the same subject in the usual way in the test of the acquisition of mathematical concepts.

23. To verify the validity of the hypothesis, the Mathematical Concepts Acquisition Test was applied, and when the scores of the students of the two research groups (experimental and control) were calculated and statistically treated using the t-test for two independent samples, it was found that the arithmetic mean of the experimental group is equal to (33.74) with a standard deviation of (3. 32), while the arithmetic mean of the experimental group is equal to (33.74) with a standard deviation of (3, 32) while the arithmetic mean of the control group is equal to (27.70) with a standard deviation of (2.05), and after using the t-test for two independent samples, it was found that the calculated t-value (8.52) is greater than the tabular t-value of (2.00) at a significance level of (0.05) and degree of freedom (59), as shown in Table (3).

Table (3) The arithmetic mean, standard deviation, and t-value of the scores of the experimental and control groups in the mathematical concepts acquisition test

Significance 0,05	p-value		Degree of freedom	Standard deviation	Arithmetic mean	Number	24. Group
	tabular	Calculated					
- functional	2,00	8,52	0	3,32	33,74	30	Experimental
				2,05	27,70	31	Control

From Table (10), it is proven that the arithmetic mean of the experimental group 33.74 is greater than the arithmetic mean of the control group 27.70 and the calculated t-value 8.52 is greater than 2.00 and this indicates the superiority of the students of the experimental group, thus rejecting the null hypothesis and accepting the alternative.

1- Presenting the result related to the second hypothesis: There is no statistically significant difference at the significance level (0.05) between the average scores of the students of the

experimental group who study mathematics with the Collins and Stevens model and the average scores of the students of the control group who study the same subject in the usual way in the social values scale.

To verify the validity of the hypothesis, the final social values scale was applied, and when the scores of the students of the two research groups (experimental and control) were calculated and statistically treated using the t-test for two independent samples, it was found that the arithmetic mean of the experimental group is equal to (81.06) with a standard deviation of (4, 57), while the arithmetic mean of the control group is equal to (71.43) with a standard deviation of (4.04), and after using the t-test for two independent samples, it was found that the calculated t-value (8.71) is greater than the tabulated t-value of (2.00) at the significance level (0.05) and degree of freedom (59), as shown in Table (4).

Table (4) The arithmetic mean, standard deviation, and t-value of the scores of the experimental and control groups on the social values scale

Significance 0,05	p-value		Degree of freedom	Standard deviation	Arithmetic mean	Number	Group
	tabular	Calculated					
functional	2,00	8,71	59	4,57	81,06	30	Experimental
				4,04	71,43	31	Control

1- Presenting the result related to the third hypothesis:

There is no statistically significant difference at the significance level (0.05) between the mean scores of the students of the experimental group studying mathematics with the Collins and Stephens model in the social values scale before and after the experiment.

To verify the validity of the hypothesis, the scores of the experimental group students before and after the experiment were calculated in the social values scale, and statistically treated using the t-test for two correlated samples, as it was found that the calculated t-values are greater than the tabular t-

value of (2.02) at the significance level (0.05) and the degree of freedom (49), as in Table (5).

Table (5) The arithmetic mean, standard deviation, and t-value of the scores of the experimental group students in the pre and post social values scale

	tabular	Calculated					
functional	2,04	22,18	2,70	10,77	4,20	70,29	Tribal
					4,57	81,06	after me

II: Interpreting the results:

Interpreting the first result: The results of concept acquisition revealed that the students of the experimental group who studied mathematics through the Collins and Stevens model outperformed the students of the control group who studied according to the traditional method of concept acquisition, and the researcher attributes this result to the following reasons:

1- The Collins and Stephens model provided freedom for students in class discussions and debates, exchanging opinions, and providing the teacher with appropriate feedback for each of the students' answers, and this led to encouraging students to obtain a quantity of information about the subject that translated into answering the acquisition of concepts.

2- The use of enriching educational activities and various exercises to determine the extent to which the students achieved the previously set educational goals, which led to the experimental group's students being able to raise the level of conceptual acquisition.

3- Collins and Stephens' model played an important role in increasing the students' self-organization of knowledge, which is one of the influential factors in the acquisition of concepts through systematic analysis and linking their previous knowledge to the current knowledge, which led to an increase in their understanding, perception, and retrieval of knowledge even after a period of time.

4- The steps followed in the Collins and Stephens model, and its suitability to the nature of the students and their mental and

cognitive levels, affected their enthusiasm for learning, which led to better results in the acquisition of concepts.

Interpretation of the second and third results: The results of social values revealed that the students of the experimental group who studied mathematics through the Collins and Stephens model outperformed the students of the control group who studied according to the traditional method in social values, and the scores of the students of the experimental group exceeded their dimensional scores, and the researcher attributes this result to the following reasons:

1. The type of experiences provided to students, the way they are presented and the sources of evaluation during lessons and cooperative work can have a positive impact on social values, and this in turn reflected on the success of the Collins and Stephens model in achieving its objectives.
2. The program focused on providing students with the skills of building and designing solutions to the issues of a social nature to some extent that they were trained to solve, and this is evident through the procedures that were implemented through the activities that were provided to the students and through the continuous evaluation of progress during the program.

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Educational programs can develop social values and skills among middle school students.

In light of the findings and conclusions reached by the researcher in this study, the researcher recommends the following:

In light of the results of the study, the researcher can conclude the following