

The Effects of Utilizing Yager's Structural Model on the Achievement of the Intermediate Second–Grade Students in Mathematics

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Abstract

The aim of the research is to identify the effect of using the Yager structural model on mathematics achievement of second–grade intermediate students.

The research sample was randomly selected from the Stability Intermediate School for student girls of Rusafa Directorate of Education. It consisted of (40) female students of the second intermediate grade, (20) of which are in each of the experimental and control research groups, and the two groups were rewarded in accordance with the following variables (age in months, IQ, previous knowledge in mathematics, previous achievement, and the educational level of the parents).

The experiment was applied in the first semester of 2021–2020, and the research tool was prepared from an achievement test in mathematics, which consists of (20) objective items of the multiple–choice type, using Kuder–Richardson formulas (KR–20). The value of the reliability coefficient was (0.86), and the search tool was applied at the end of the experiment, after collecting the data, and using the appropriate statistical means. In light of these results, students of the experimental group who studied using the Yager structural model outperformed the control group students who studied in the usual way in the achievement test, and in light of the results, a number of recommendations and proposals were made.

Research problem

The issue of poor academic achievement in mathematics has become one of the main concerning problems to the student, the teacher, and the family, and this problem can be clearly seen when the learners face some mathematical issues, so we find them solving it painfully and with lack of focus, which led to the emergence of a weakness in achievement, as confirmed by the study (Yassin Ahmed, 2012) and (Rashid, 2015) attributed the reason for this to factors related to the family, the teacher, and to the school environment. In addition to factors

related to the learner and the nature of the family environment in which the learner lives, including the physical and psychological health of the learner, the level of his mental abilities, and the suffering of the learner. From the presence of personal or family problems, the psychological pressures surrounding him, the inability of the learner to interact socially with others, the lack of follow–up by the parents, the low cultural level of the parents, the lack of a suitable atmosphere for studying at home, the learner’s unwillingness to school education and the lack of self–motivation. As well as the

difference in the cognitive style of a learner from what the teacher uses in terms of instructional and methodological strategies, and the teacher may be academic or functional, completely unqualified and his experiences are tribal. (Al-Amayreh, 2010: 183). The research problem can be summarized by answering the question: What is the effect of using the Yager Structural Model on mathematics achievement for intermediate second-grade students?

Importance of the Research

In order to advance the educational process and reach high standards, and achieve the goals, the development of education programs is required. That is by relying on modern teaching models that stimulate students' interest and give them self-confidence, and make the learner seek the path of knowledge in order to truly understand information and benefit from it in many situations that may encounter the learner in his

life, as the usual methods of teaching do not enable the learner to investigate, discover, and access the information by himself according to certain steps or stages, so it is imperative for us to find modern teaching models that include steps or stages that enable the learner to investigate and discover information and access it by himself and form his cognitive structures. This development and modernization may require the adoption of modern teaching methods to help students raise the level of their achievement. This has encouraged a number of educators to develop effective teaching-learning models and strategies stemming from the cognitive and constructive learning theories and their application in the educational process (Al-Azirjawi, 1991: 383).

This is what prompted both researchers to adopt a modern teaching model, which is the Yager Structural Model, which includes four

stages: the advocacy stage, the exploration stage, the suggestion of interpretations and solutions stage, and the decision-making stage, which are intertwined and complement each other.

This model works to achieve cognitive goals, and it helps learners build concepts, theories and generalizations in their mental structure and makes them the focus of the educational process by confronting them with a specific mathematical problem where they collect and investigate information that they see may contribute to solving this problem and then discussing with each other in Groups divided in the classroom around the proposed solutions that they have reached and then apply in other situations, and here the role of the learner is prominent and important as he searches and discovers himself and carries out activities and provides effective participation in learning which leads to retention of

information significantly and helps him to understand better (Yager, 1991: 56).

The learning environment using the Yager constructive model is characterized as an open environment, allowing the involvement of both the teacher and the learner in decision-making and problem solving, stimulating thinking abilities, competitiveness, centered around the learner, respecting the interests and abilities of the learners, in which the learners are encouraged to build their own methods of learning, which are rich in resources and tools that aid the learning process, and the learning process using these methods are meaningful as they help in the independence of learners instead of relying on the teacher (Greening, 1998: 17).

(Murphy, 1997) demonstrated the effectiveness of constructive learning models in developing life skills, speaking and dialogue skills, and the

spirit of cooperation between learners, providing learners with a sound dialogue language, and making the learner active, as it provides an opportunity for discussion and dialogue between the learners themselves, and between the learners and the teacher. As the nature of the activities and tasks on which the constructivist theory models depend, and the positive, interactive role of the individual during the stages of those models leads to the development of many goals in addition to the cognitive goals, including the development of the learner's ability to apply knowledge in new learning situations and contexts, and the development of discussion, dialogue and teamwork skills, And mathematical life skills where individuals enjoy cooperating with each other on learning tasks (Murphy, 1997: 114).

And since academic achievement aims primarily to obtain knowledge, information, tendencies and skills that

show the extent to which learners comprehend what has been taught in the prescribed school subjects as well as the extent to which each one of them has obtained from the contents of the subjects, by examining the tribal gains to diagnose and know the strengths and weaknesses of The learner and the disclosure of the different educational levels in order to classify the learners according to their levels in order to help each one of them all adapt to the middle of the school and try to raise his educational level and measure what the learner has learned in order to take the largest possible amount of appropriate decisions that benefit them and adapt the activities and educational experiences decided upon According to the data collected in order to exploit the different capabilities of learners and determine the effectiveness and suitability of all learners to continue or not continue receiving educational experiences in

addition to improving and developing the educational process (Pro, 276: 2010).

(Al-Hasani, 2011) indicates that the importance of academic achievement lies in stimulating learners and creating a spirit of competition, which ultimately improves the achievement process and helps teachers to know the extent to which learners respond to the explanation and understand the scientific material so that the teacher can modify his method of explaining whether their achievement scores are low and Determining the competence of academic subjects, curricula and teaching methods, selecting learners, classifying them into study groups, promoting them to the highest levels of study, organizing learning experiences and linking them together, discovering the different mental and mood preparations of learners, as well as knowing the educational level of the learner and the difficulties he faces during the learning process and obtaining

information about the learner's arrangement In achievement in a specific experience and its center in relation to his peers in the class (Al-Hasani, 2011: 329-330).

Accordingly, the importance of the current research can be reflected in the following:

1- It is of importance to educational institutions due to what it adds about constructive teaching models, as the findings of the research contribute to shedding light on the effectiveness of this model in teaching mathematics and enables it to open a field for other studies with the aim of improving the teaching-learning process.

2- It may contribute to raising the level of academic achievement of the learners and developing their mental abilities and capabilities.

3- It may help learners to develop their thinking, raise their achievement, and make them think and discover

the largest possible number of solutions to problems and take appropriate decisions and procedures and apply them.

4– The current research paves the way for other research and studies that help in developing the field of mathematics teaching.

5– Maximizing the benefit of teachers and teachers from the achievement test to measure the achievement of their students.

Research Goal

The current research aims at:

Identifying the effectiveness of the Yager Structural Model in the achievement of intermediate second-grade students in mathematics.

Research Hypothesis

To verify the two objectives of the research, the following null hypothesis is set:

There is no statistically significant difference at (0.05) level of significance between the average

scores of the experimental group students who are going to study mathematics according to the Yager structural model and the average scores of the control group students who are going to study the same subject using the usual method in the achievement test.

$$H_0: \mu_1 = \mu_2$$

$$H_1: \mu_1 \neq \mu_2$$

Limits of the Research

The current research is limited to:

1– Female intermediate students of the second-grade in the morning middle schools for Girls of Rusafa Directorate of Education/ Baghdad.

2– The first semester of 2020–2021.

3– The content of the chapters (Chapter One: Rational Numbers – Chapter Two: Real Numbers – Chapter Three: Limits – Chapter Four: Equations and Inequalities) from the mathematics book of the

second intermediate grade, 2nd Edition, 2018.

First: The Yager Model:

- **(Yager, 1991):**

It is a model based on constructivism theory that seeks to help learners build their scientific concepts and knowledge through four stages that go in succession, starting with the first stage (the invitation) by posing problems that challenge their abilities and knowing what they have of previous experiences to lead them to the second stage (exploration) to work. The learners in the activities trying to reach a solution to the problems raised in the advocacy stage, then in the third stage (suggesting interpretations and solutions) they reach the required concepts through the transfer of information, collecting and interpreting the answers, and in the fourth stage (decision making), through which, what they expand and apply what

they learned in new educational situations (yager, 1991: 54)

- **Zaitoun (2003):**

It is a model through which learners are helped to build their knowledge (concepts, principles, laws) on the new topic of the lesson by placing them in a situation for a problem, then they are directed to conduct an exploratory activity to test the validity of their basic ideas, then present their findings and interpretations and summarize them in Basic information picture for use in new situations (Zaitoun, 2003: 383).

Theoretical definition:

Both researchers adopted (Yager's, 1991) definition, a theoretical definition, because it is suitable to the requirements of this research.

Procedural definition:

It is a model that emerges from the constructivist theory that enables the active and positive participation of female students, as it is based on

four stages (invitation, exploration, suggestion of solutions and decision-making) that the researcher follows in teaching the experimental group of second-grade intermediate students in mathematics.

Second: Achievement:

- **Ibrahim (2009):**

It is the score that the student obtains in the achievement test according to his responses to it after completing his studies for an educational program (Ibrahim, 2009: 235).

- **Al-Jalali (2011):**

It is the actual performance level of the individual in the academic field resulting from the student's mental and cognitive activity process, and it is evidenced when evaluating the student's answers to a set of theoretical, practical or oral achievement tests presented to him at the end of the school year or in

the form of standardized achievement tests (Al-Jalali, 2011: 25).

Theoretical Definition:

Both researchers adopted Ibrahim's definition (2009), a theoretical definition, which suits the requirements of this research.

Procedural definition:

It is the amount of mathematical knowledge that the second-grade intermediate students obtain after passing through the educational experiences related to the classes (the first: the rational numbers, the second: the real numbers, the third: the boundaries, and the fourth: the equations and inequalities) from the mathematics book for the second-grade intermediate, measured by the degree they would obtain from the answers to the test items of the achievement test in mathematics prepared for this purpose.

Yager Constructive Model:

It is a teaching model based on constructivism theory, this model was introduced by Trowbridge and Bybee in 1989, and it was mentioned by different names, including the constructivist model in education that directs learning, and the didactic-learning model where this model was modified and developed in its current form by (Susan – Loucks Horsley, 1990), and the term (the Constructivist Learning Model), which was used by (Yager, 1991).

The constructivist model is the most recent of the educational models that emerged from the constructivist theory based on the ideas of constructivism theory in making learning meaningful, and making the learner the focus of the educational process, as it emerged as a result of a major shift in educational research during the past two decades, as the focus shifted from external factors That affect the learner's learning so that this focus turns to the internal factors that affect this learning, and

everything that makes learning meaningful to him (Yager, 1991: 53).

(Brown, 2016) indicated that the Yager constructive model stems from the fact that building knowledge in the student is a product of classroom activities and interactions, and that this participation stimulates the student and increases his motivation to learn, and that the constructive learning model is directed towards analyzing and understanding the elements of experience (concepts, skills and generalizations), and employing them in building Knowledge according to his abilities and inclinations, through tasks including research, discovery and problem solving, while developing social skills such as negotiation, managing activities, and leadership within work groups (Brown, 2016: 49).

Foundations the Yager Model is based upon:

1. Solving learners' questions and ideas and use them to fully guide sessions and learning units.
2. Accepting and encouraging learners to initiate ideas.
3. Using learners' thinking, experiences, and interests to guide lessons.
4. Encouraging learners to test their own thoughts, that is, to answer their questions, their guesses regarding causes, and their predictions of specific consequences.
5. Searching for learners' ideas before presenting the teacher's ideas or before studying ideas from textbooks or other sources.
6. Encouraging learners to challenge each other's concepts and ideas.
7. The use of cooperative learning strategies that emphasize cooperation and respect for individuality and the use of division of work methods.

8. Allow sufficient time for reflection and analysis; Respect and use all insights that learners generate.

9. Encouraging self-analysis, gathering real evidence to support ideas, and reformulating ideas in a new methods and approaches (Yager, 1991: 55).

Stages of the Yager Model:

The Yager constructive model aims at making students learn new knowledge by building it on their own, and supports self-learning through the development of learning and research processes, and teaching in this model is done by passing through four integrated and consecutive phases, respectively, each stage linked to the next phase, which is:

1– Invitation Stage:

This stage aims at attracting the attention of the learners and involving them in the activity, via asking questions and problems by the teacher that challenge their abilities

and stimulate them intellectually, and reveal their previous experiences, or display an image that includes a real problem to invite them to learn. This is done by stimulating learners and motivating them to the new topic presented in the lesson, and their integration in the learning process, in order to reach the identification of the problem and its connection with the previous experiences of the learner and the feeling of the need for research and investigation.

2– Exploration Stage:

This stage is centered on the learner, where the learners' work begins in the activities trying to reach a solution to the problem or answer the questions raised in the advocacy stage, and this is through cooperative groups to discuss what is presented to them through conducting activities, and in this, the learners participate in a discussion among themselves. By searching for information and data, collecting and organizing them, using

appropriate strategies to solve problems and brainstorming possible alternatives, and trying to reach something reasonable and meaningful from the information and data that they have collected, where the learner participates in building meaning himself, and interacts with the rest of his group to reach a solution to the problem, amend or change Ideas and information so that members of each group respect the opinions and ideas presented by their other colleagues, and the teacher's role at this stage is a facilitator of learning, and he must give direction, guidance, facilitation, or attribution whenever necessary.

3– Proposing Explanations and Solutions Stage:

At this stage, learners reach the required concepts by transferring information and ideas, collecting answers, interpreting results and solutions to problems, discussing information exchange and solutions,

reviewing and criticizing them, and adopting new interpretations, thus merging the solution, knowledge and current experiences, and because learners passed previous experiences, and tested new experiences With the studied concept related to the procedures, it is then possible to amend the previous concepts of them, and the role of the teacher is to organize discussions, direct ideas and solutions among the learners, appreciate their ideas and suggestions, and help them to communicate their ideas and suggestions to the rest of the group members, with participation in the evaluation of ideas and proposed solutions to the problem or imposed questions, and then, reconciling the solution and experiences.

4– Taking Action Stage:

At this stage, the learners' learning of the ideas, concepts, knowledge and skills that they have reached is expanded and deepened, and this

occurs through conducting an activity related to the researched topic and asking new questions to apply the knowledge and skills they have learned, that is, the transfer of the learning effect to new educational–learning situations, the more the learners make the decision by themselves. The new concepts are applied to the situations that occur to them, a cognitive merging occurs between the new concepts and the previous concepts, which leads to the cognitive building process.

The stages of the Yager constructive model are integrated with each other, as each stage performs a specific function in preparation for the next stage, so the call stage leads learners to search and investigate to reach a solution to what is presented to them in this stage, and in the exploration stage learners integrate into activities in search of a solution in what is presented In the advocacy stage, and in the stage of proposing interpretations and solutions, the

teacher leads the learners to arrive at the required concepts through their solutions, interpretations and proposals in the exploration stage, and in the decision-making stage the concepts they have reached in the stage of proposing interpretations and solutions are applied in other similar situations or in life, and whilst learners engage in the activities of the decision-making stage, they may encounter new information that leads to a new invitation, and thus a new cycle of the Yager constructive model begins (Yager, 1991: 55–56).

Achievement

Achievement in mathematics receives great attention due to its importance in the life of the individual and the consequent educational decisions that result from it. Achievement tests are an organized method aimed at measuring the amount of information that the learner saves or remembers in a field of knowledge, as well as its ability to understand or apply it, And

its analysis and its use in different life situations (Alawneh, 2002: 88).

Academic achievement is one of the basic criteria on which the evaluation process depends, as it is the primary means by which it is possible to judge the extent to which learners obtain scientific outcomes, as the educational institutions represented in schools in general in their various stages, and institutes and colleges give great importance to the degrees of learners' achievement. In addition to their total points, as it is concerned with discovering the different preparations of the learners, and through this it becomes clear that achievement is one of the main forms or aspects on which the evaluation process depends, as measuring the level of achievement means identifying and assessing what the learners have achieved from the learning outcome as a result of their passing through a specific educational experience, which is what It reveals to us the extent of the

learners' progress towards achieving specific educational goals (Zaitoun, 2001: 479).

The teacher is considered an influential factor in academic achievement because of its fundamental and direct role in the level of learners and their achievement, and that this effect may be negative or positive, due to his ability to diversify the methods and methods of teaching that he follows and the extent to which he takes into account individual differences among learners, his general mood and personality style, the extent of his ability to generalize the achievement tests in a good and objective way, his objectivity in the distribution of grades in proportion to what the learners deserve. Although, in order for the teacher to perform his usual role and lead to the systematic and intended results of the learners, he must possess the following:

1. Mastering of the subject matter of the curriculum or textbook, then general knowledge associated with it from other academic fields.
2. He can teach any of his academic, vocational, professional and other skills, theoretically or practically.
3. He should possess positive tendencies towards the teaching profession and working in it, as well as the human spirit in dealing with learners (Abu Hamza, 2016: 113).

[Previous Studies](#)

- **Beckett Study (2000):** This study was conducted in America, aimed at the effectiveness of the constructive learning model among university students who are classified at a perceptible level on achievement in statistics and probabilities. The research sample consisted of (65) undergraduate students, and it was divided into two groups: experimental and control groups. Achievement test was prepared in mathematics. The results of the study showed the

superiority of the experimental group over the control group in the achievement test.

- **(Al-Zuhairi, 2008) Study:**

This study was conducted in Iraq. This study aimed to identify the effect of using constructive education on achievement and critical thinking among middle school students in mathematics. The research sample consisted of (60) students of the fifth grade of science, and it was divided into two groups: experimental and control. Research tools: Achievement test in mathematics and the critical thinking test. The results of the study showed the superiority of the experimental group over the control group in the achievement test and the critical thinking test.

- **(Al-Obaidi, 2015) Study :**

This study was conducted in Iraq. This study aimed to

identify the effect of teaching with a strategy for constructive learning on achievement and innovative thinking among fifth-grade students in mathematics. The research sample consisted of (65) male and female students in the fifth grade of primary school, and it was divided into two groups: experimental and control. Research tools: Achievement test in mathematics and innovative thinking test. The results of the study showed the superiority of the experimental group over the control group in the achievement test and the innovative thinking test.

Experimental Design

The quasi-experimental design with partial control was used for the two research groups (experimental and control) as the Yager model represents the independent variable for the experiment, while achievement

represents the variable dependent on the experiment.

Research Community and Sample:

The research community consisted of all female students of the second intermediate grade in the governmental middle and secondary day schools of the Rusafa Directorate of Education/ Baghdad, for the academic year 2021–2020, and the research sample was randomly selected from female students of the second intermediate grade in the stability intermediate school for girls of the directorate. Baghdad Education General / Rusafa 1, the school contains (6) classes for the second intermediate grade, the total number of students reached (305) students, class (C) was chosen randomly to represent the control group with (20) students, while Division (F) represented the experimental group with (20) students.

Control Procedures:

The two groups were rewarded in the variables (intelligence, age, previous information in mathematics, and previous achievement in mathematics).

Choosing the scientific subject:

The scientific subject was determined according to the curriculum content of the mathematics book scheduled for the second intermediate grade of the chapters to be taught during the first semester of the academic year (2020–2021), which are (Chapter 1: the rational numbers, Chapter 2: the real numbers, Chapter 3: the boundaries, and Chapter 4: Equations and Inequalities).

Formulating Behavioral Objectives:

Behavioral goals are formulated according to Merrill's classification of behavioral goals, which includes three levels (remembering, applying, and exploring).

Preparation of Study Plans:

A group of teaching plans were prepared, totaling (90) daily teaching plans, with (45) plans for each of the two research groups.

Research tools:

Achievement Test:

1– Drafting of test items : (20) objective test items of the multiple-choice type were formulated.

2– The validity of the test : Two types were relied upon: the apparent validity for verification, as it was presented to a group of arbitrators, and the validity of the content by preparing a table of specifications, in order to ensure that the test items represented the content of the course material and the behavioral goals.

3– Preparation of the test

instructions: The instructions of the test were attached to the test paper in order to complete the initial version of it.

4– Statistical analysis of the test

items: The test was applied to an

exploratory sample consisting of (100) female intermediate second-grade students at Al-Iman Intermediate School for Girls Rusafa Directorate of Education/ Baghdad on Sunday (7/2/2021). The difficulty factor was calculated and found its value ranges between (0.74–0.35) and thus all the paragraphs are considered acceptable in terms of the difficulty factor, and none of them have been deleted, and the discriminatory power was calculated and found to range between (0.22–0.81), and thus all paragraphs are considered acceptable in terms of their discriminatory ability and none of them are deleted As the effectiveness of each wrong alternative was calculated, it was found that the coefficients of all alternatives are negative and thus all alternatives are considered effective.

5– Stability of the Test : According to the reliability of the test, using the Kuder–Richardson formula 20, where the test reliability coefficient reached

(86%), which is a good reliability coefficient.

Procedures for Applying the

Experiment: The application of the experiment began on Tuesday (12/8/2020) at (5) sessions per week for each group. The achievement test was applied on Tuesday (2/16/2021) for the experimental and control research groups.

Statistical Tools: The T-test, the Effect Size.

Results:

The Hypothesis: It states that (there is no statistically significant difference at (0.05) level of significance between the average scores of the experimental group students who studied mathematics according to the Yager structural model and the scores of the control group students who studied the same subject in the usual way in the achievement test. Table (1) represents the statistical results of the achievement test for the experimental and control research groups.

Table (1) the statistical results of the mathematics achievement test for both (experimental and control) research groups.

Group	Division	Number of Students	Arithmetic Mean	Standard Deviation	Standard Error	Levin's test for the equality of both variances		(T-test) for the equality of both means		The level of statistical significance at (0.05)
						F	Indication	Calculated	Tabular	
Experimental	F	20	16.10	2.292	0.512	2.448	0.126	3.135	2.021	Function
Control	C	20	13.35	3.183	0.712					

This indicates the superiority of the experimental group students who

studied according to the Yager structural model and the scores of the control group students who

studied the same subject in the usual way in the mathematics achievement test. With this, the null hypothesis is rejected and the alternative hypothesis is accepted.

To determine the size of the effect, that is, the effect of the independent variable (the Yager structural model) on the dependent variable (achievement), the Eta-squared test (η^2) was used and the value of (d) was calculated, which expresses the effect size in Table (2).

Table (2) The magnitude of the effect of the independent variable in applying the Yager Structural Model on achievement in mathematics.

Independent Variable	Dependent Variable	η^2	d	Effect Size
Yager	Achievement	0	1	Big

Structural Model	Evening	0	1	Big
		2	0	
		0	1	
		6	9	

We notice from Table (2) that the value of (η^2) is (0.206), and the value of (d) is (1.019), which means that the effect size of (the Yager structural model) is large on the dependent variable (achievement), based on the reference table (3).

Table (3) a reference table to determine the Effect Size.

Effect Size				
To be Used	Small	Medium	Big	Very Big
η^2	0.01	0.06	0.14	0.20
d	0.2	0.5	0.8	1.0

			8	10
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(Kiess, 1989: 446–445).

Interpretation of results:

The results presented in Table (1) showed the superiority of the students of the experimental group who studied mathematics according to the Yager structural model over the students of the control group who studied the same subject according to the usual method of test achievement in mathematics, and this result was consistent with the results of each (Beckett, 2000) and (Al-Zuhairi 2008) studies, and this can be attributed to several reasons, including:

1) The Yager structural model is one of the modern teaching models that make the student the center of the educational process, by giving her the role of discovery through the processes of (research and investigation to reach the correct

solutions), and it helped to understand the information and build it in the student's knowledge structure in a meaningful way, which affected the achievement.

2) Teaching with the Yager Model helped to present concepts and ideas, clarify the relationship between the concepts of one lesson and previous lessons, recognize the common characteristics and relationships between knowledge and information and classify them, identify similarities and differences between them, and compare them with the information and ideas that the student possesses in her knowledge structure, and this is what helped Raise the level of achievement.

3) This model increases the student's ability to understand mathematical concepts through accurate procedures that the teacher performs, which is the analysis of the learning structure according to the Yager constructive model that results in

knowledge of the previous requirements for learning new concepts and diagnosing the strengths and weaknesses of each student.

4) The use of the Yager constructive model gives the student an opportunity to discuss and dialogue with other students within cooperative groups or with the school, which makes her sound dialogue language and makes her active and effective in the educational process, which contributed to raising the level of achievement.

Conclusions:

1. The students of the experimental group who studied according to the Yager constructive model outperformed the control group students who studied according to the usual method of achievement test in mathematics.

2. Teaching the Yager structural model makes the student the focus of

the educational process, and this is what modern education emphasizes.

3. Teaching according to the Yager structural model helped to organize the mathematical material and divide it into parts according to successive steps that had a great impact on understanding and comprehending the topics.

4. The Yager Structural Model contributed to the teaching of mathematics in a sequential, interdependent and integrated manner.

5. Teaching mathematics using the Yager structural model had a positive effect on the achievement of the intermediate second-grade female students.

Recommendations:

1) Holding training courses in educational research centers and for curriculum planners in the field of mathematics to train them on how to program and build some mathematics

contents for all academic levels in light of the models used.

2) Emphasizing that mathematics teachers create a democratic atmosphere in the classroom, and work to create an educational and social environment that develops mutual human relations, and to encourage greater mathematics achievement.

3) Directing the attention of education officials in both the Ministry of Higher Education and Scientific Research, and Ministry of Education, towards the need to pay attention to the constructive Yager model in teacher preparation programs, as well as training courses for mathematics teachers during service.

Suggestions:

1– Conducting a study similar to the current research on other dependent variables such as productive thinking, critical thinking, and the acquisition of mathematical concepts.

2– A comparative study between the Yager constructivist model and other models that do not depend on constructivist philosophy.

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