



THE EFFECT OF THE TASK-BASED LEARNING STRATEGY (TBL) ON THE ACHIEVEMENT OF FIRST-GRADE INTERMEDIATE STUDENTS IN SCIENCE AND THEIR INFERENCEAL THINKING

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Article history:	Abstract:
<p>Received: 10th January 2022 Accepted: 10th February 2022 Published: 25th March 2022</p>	<p>The research aims to identify the effect of the task-Bases learning strategy (TBL) on the achievement of first-grade intermediate students in science and their inferential thinking, The research sample amounted to (74) students, with (37) students in the experimental group and (37) students in the control group. The two research groups were rewarded in the variables (chronological age, intelligence test, previous information test scores in science, and previous achievement). in the second part of the science book to be taught, The behavioral objectives of the five chapters, which numbered (169), were formulated as behavioral objectives representing the four levels of Bloom's classification in the cognitive domain (remember, comprehension, application, and analysis) He promised one of the two tools, the achievement test, and adopted the (Al-Dulaimi, 2014) scale of inferential thinking, The achievement test consisted of (30) items of a multiple-choice type with four alternatives, while the inferential thinking scale consisted of (20) items with four alternatives, and extracted the psychometric properties and stability for them, The data was analyzed and treated with the adoption of the statistical package SPSS and the Office program (Microsoft Excel) and the experiment was identified (12) weeks, and at the end of the experiment, the researcher applied the achievement test and the inferential thinking scale, The students of the two research groups, and the results were corrected and treated statistically. The results showed that the students of the experimental group differed over the control group in the achievement of science and their inferential thinking.</p>

Keywords: Task based learning (TBL), Achievemem, Inferential thinking.

INTRODUCTION:

In the current era, many fields and specializations of scientific and professional life have developed, including developments in educational and psychological sciences and their various fields, including educational theories in the teaching process, teaching strategies and modern scientific trends in the teaching and education processes, including the social constructivist theory that clearly increased interest as one of the educational theories and psychology that has a positive impact on teaching and learning processes inside and outside the classroom, The science subject is one of the branches of the natural sciences because its content focuses on students through training them on methods of scientific research and thinking, based on mental processes that guide them towards solving practical problems. And its main importance through its effective contributions to innovation, improvement and technological development.

PROBLEM OF THE RESEARCH :

The most recent major and important problem that worries teachers is the poor level of achievement and their inferential thinking in science, and this was confirmed by many local studies conducted in Iraq such as a study (Khashman, 2019) and a study (Maykhan, 2019) and study (Kazim, 2020) and study (Cooks, 2021) Although science curricula include a lot of information and scientific knowledge, teachers so far use the usual methods and teaching strategies in teaching students, which focus on remembering information and memorizing only, which does not help them to think inductively, In order to achieve progress and development in peoples, the capabilities and capabilities of their members must be rebuilt by following various modern strategies in teaching to achieve the main goal of education, which is for students to learn in order to be in the future and not just to know, and this is done through the renewal and permanent development of educational institutions And educational, including the rehabilitation of

teachers, raising their skills and competencies, diversifying their experiences and abilities with the renewal of strategies, curricula and teaching aids, especially in light of the great explosion of knowledge and technology, because it is the most influential in this development that contributes to raising the level of their achievement and thinking.

IMPORTANCE OF THE RESEARCH :

The most important roles that educational institutions should pay attention to is the development of thinking among students, as if they are well directed and guided in understanding the problems that surround them, research and work to solve these problems through one of the most important types of thinking, which is deductive thinking, and the importance of this thinking emerges as the basis which is based on other types of thinking, where everyone agrees that deductive thinking is the common element between all other types of thinking, such as reflective thinking, creative thinking, scientific thinking and critical thinking (Al- Jumaily, 2014). With these data, the importance of the research by adopting the strategy of task-based learning (TBL) in teaching, which previous studies, such as the study (Al-Sayed, 2010) and the study (Hamad, 2017), showed an increase in achievement and an increase in their desire to learn. The task-based learning strategy can be described as a model An integrated, multidisciplinary education that offers rich learning opportunities for students. TBL is concerned with placing students in challenging situations that require students to analyze the problem on their own and learn the knowledge needed to solve problems. Sometimes they need to work in collaborative groups to solve these activities or tasks. Teachers take Real-life problems as teaching materials to motivate students (Hong,2010).

OBJECTIVES OF THE RESEARCH :

This research aims to identify the effect of the task-based learning strategy (TBL) on the achievement of first-grade intermediate students in science and their inferential thinking.

HYPOTHESIS OF THE RESEARCH :

In order to achieve the research objective, the following two null hypotheses were formulated:

-There is no statistically significant difference at the level of significance (0.05) between the average scores of the experimental group students who studied biology according to the task-based learning strategy (TBL) and the average scores of the control group students who studied biology according to the usual method in the achievement test for science.

- There is no statistically significant difference at the level of significance (0.05) between the average scores of the experimental group students who studied biology according to the task-based learning strategy (TBL) and the average scores of the control group students who studied biology according to the usual method in the achievement test for science In a deductive reasoning test.

LIMITS OF THE RESEARCH :

The human and time limit: students of the first intermediate grade, the second semester of the academic year (2020-2021)

Spatial boundary : middle schools affiliated to the General Directorate of Education in Diyala Governorate / Baquba Center / Al-Rahma Intermediate School for Boys

Cognitive limitation: The subject is defined in the five chapters of the Science Book (Biology).

Limiting of The Terms :

1. Task-Based Learning Strategy :

(Hamad, 2017) as: "a strategy based on self-learning and includes three sequential steps (1-pre-task phase 2- task implementation phase 3- post-task phase) and implemented in order to provide students with integrated skills with a clear goal." (Hamad, 2017)

2. Achievement : - (Al-Saadi, 2020) as: "The degree that the student achieves, or the level of success that he achieves or reaches in the academic subject at an advanced level in the educational field." (Al-Saadi, 2020)

3. Inferential Thinking : (Khawaldeh, 2016) as: a mental process that includes a set of sub-skills that constitute a cognitive mental activity characterized by deriving the part from the whole and extrapolating the rule from its parts, where the student walks from issues and facts that are valid to the knowledge of the unknown mentally. (Khawaldeh, 2016).

THEORETICAL FRAMEWORK AND PREVIOUS STUDIES:

First - Theoretical framework:

Task-Based Learning:

This strategy is based on the social constructivist theory founded by the Russian scientist (Vygotsky), where this theory focuses on the main role of the student in acquiring and building knowledge from mainly through learning through social negotiation (cooperative learning). Towards the desired goal, which is determined by the students' possession of competencies and abilities, and from here the interaction between students helps the process of continuous growth and development of the knowledge structure. Prabhu developed this strategy in 1980 with the aim of enhancing and supporting the process of teaching communicative languages among students, as Prabhu believes that the appropriate learning process for students is more effective when they are engaged in implementing classroom or non-classroom activities and tasks. (TBL) is a framework and work approach in which tasks, duties and practical

activities are necessary for learning to occur, and the language of communication between students has the greatest role for collaborative work and achievement of required purposes. (Sholeh,2020). There were many opinions in clarifying the concept of this strategy, including:

- (Lee, 2000) that: "Learning depends mainly on a class activity or training that has a main objective and is achieved through interaction between its participants and has a sequential interaction method with a focus on constructing meaning, which requires students to understand, process and produce the required ideas as if They were performing a set of action plans."

- (Ardiyani, 2021) - An educational approach in which students learn the skill of communicating with others through performing the task in the classroom, which requires the teacher's competence in identifying new tasks and choosing appropriate activities for their level to complete the tasks, and this approach can meet the current learning needs by developing skills Students that enable them to work at their own pace.

After reviewing a set of previous opinions about the concept of this strategy, the researcher finds that:

1. This strategy emphasizes making the lesson contain various tasks and activities that take into account individual differences.
2. The strategy contains steps arranged in a sequential and sequential manner, which is the stage before the task, the stage of implementing the task, and the stage after the task.
3. Focuses on and cares about cooperative work (social negotiation) among students.
4. The tasks contain a variety of questions with specific goals.
5. It encourages and motivates team work and accepts the opinions of others.

Stages of implementing a task-based learning (TBL) strategy:

It includes a set of steps and stages that were identified using the study of (Huffman & Bray 1996), (Printer: 2006), (Winnips: 2005), (Kearney: 2006) and (Murat: 2011): -

1. The pre-task stage : This stage depends largely on the teacher, as the planning and organization of the task and how to do it by the students Determining the topic of the assignment (the title of the lesson), then an accurate scientific reading (of the lesson) and understanding its content, and the important elements that must be emphasized and emphasized Determining the type of task that fits with the nature of the lesson, and the tasks can be varied within a single lesson or one style according to the teacher's vision, The objectives should be comprehensive, diverse and procedural Determine a specific time to complete the task, Use of educational media and tools that contribute to the completion of tasks.

2. The task stage : It is the activity or work that is practiced while performing the task, and the student has the primary and greatest role in the performance The teacher gives directions, and instructions to the students on how to carry out the task, It gives worksheets that include various questions, It encourages the generation of ideas through teamwork, The student benefits from the feedback provided in the direct learning environment or from the answers of others.

3. The Post- Task Stage : The teacher makes sure that the task and goals undertaken by the students at this stage are accomplished, and the extent to which they have achieved the results, and it is in the form of (a final evaluation of all the elements of the lesson), the students' vision of the topic of the lesson, and its applications in reality, and the preparation of reports, discussions and dialogues in the classroom led by the teacher, with Enhancing the outstanding and outstanding students' performance in accomplishing the task and encouraging others to put more effort into the upcoming tasks.

Explain (Methods, 2013), (UKEssays, 2018) that task- based learning has characteristics, including:

1. Transferring the focus of the learning process from the teacher to the student, rather than the teacher's focus only through the availability of instructions provided by the teacher to the student.
2. It encourages and motivates teachers to diversify their skills in teaching strategies.
3. Doing assignments helps students build clear and meaningful knowledge and concepts,
4. Provide opportunities for students to focus on the task so that it encourages them to reach meaningful goals.

Achievement:

In its various forms is one of the main objectives in education because of its educational importance in the lives of students. He has most educational decisions in education, and achievement is of great importance in daily life, which is no less important than academic life, to contribute to the student's adaptation in society and to facing his problems through the use of his knowledge in thinking and solving problems or making immediate and future decisions, as well as competition in Obtaining jobs and other professional work.

Inferential Thinking

Where some educators see that inferential thinking is one of the logical processes in which the student moves from known facts or agreed-upon topics to identifying the unknown, which is the necessary results of those facts and topics, while others see it as the ability to interpret and logical conclusion with realizing the relationships to link between Causes and Effects, which includes processes such as establishing relationships, finding solutions and answers to problems, abstracting, making generalizations, evaluating opinions, and eliciting conclusions. (Al-Jawahiri, 2015).

Deductive thinking is one of the types of thinking appropriate for the study of science, due to what it achieves in the ability to reach the most important elements of the structure of science, which are represented by facts, concepts, laws, generalizations and theories. Deductive reasoning is one of the primary goals of science education.

(Ali, 2013) defines inferential thinking as a mental process that occurs through interaction with phenomena and things, and it occurs when the student is exposed or confronted with a problem for which he does not find a ready solution, as it places the student in front of new and developing mental capabilities, which contributes to liberating his thinking from the limits of tangible reality to The world of mental imaginations, theories and principles.

Second: Previous studies:

Table (1) : the studies that dealt with the strategy of task-based learning (TBL)

T	Name, country and year of the researcher	Purpose of the study	Educational level study method	Sample type, size, and number	Study tools	Statistical means	Results
1	El-Sayed (2010) (Saudi Arabia	Knowing the effectiveness of using the task-based learning strategy (TBL) in the acquisition of secondary school students in Saudi Arabia some verbal communication skills in biology.	High school students semi-experimental	66 female Students 33 demo 33 female officers	Verbal scientific communication skills test (listening, speaking, writing, reading).	T-test for two independent samples	-The results of the study showed that there were statistically significant differences at the level (0.01) between the mean scores of the experimental group (23.52) and the arithmetic mean of the students of the control group (23.09) in the post application of the verbal communication skills test in favor of the experimental group. -The study also found to prove the high effectiveness of the task-based learning strategy (TBL).
2	Hamad, (2017) Palestine	Explanation of the effect of employing the strategy of task-based learning (TBL) in developing concepts and scientific communication skills for the ninth grade students.	Ninth grade students descriptive and experimental	54 female students 27 demo 27 female officers	Scientific concepts test, note card for scientific communication skills, teacher's guide.	T-test for two independent samples	-The results of the study showed that there were statistically significant differences at the level (0.05) between the mean scores of the experimental group (34.78) and the arithmetic mean of the students of the control group (30.37) in the post application to test scientific concepts in favor of the experimental group. - The results also showed that there were statistically significant differences in the science communication skills test in favor of the experimental group.

Table (2) : The Studies that dealt with Inferential thinking

T	Name, country and year of the researcher	Purpose of the study	Educational level study method	Sample type, size, and number	Study tools	Statistical means	Results
1	Al Dulaimi, (2014)	Knowing the effectiveness of	female students	90 female students	achievement test, and	t-test for two	-The students of the experimental group

	Iraq	teaching with the learning dimensions strategy in the achievement of first-grade intermediate students in biology and their inferential thinking.	middle first grade experimental	45 demo 45 female officers	Inferential thinking test	independent samples	who studied according to the strategy of difficulty of learning dimensions outperformed the students of the control group who studied according to the alternatives, the usual method in the achievement test and inferential thinking skills.
2	Khalaf and Ferial, (2018) Iraq	Knowing the effectiveness of the priority pyramid strategy in the achievement of biology and inferential thinking skills for fourth-grade students of science.	female students Fourth grade science experimental	60 female students 30 demo 30 female officers	achievement test, and Inferential thinking test	t-test for two independent samples	- The students of the experimental group who studied according to the pyramid of preference strategy outperformed the students of the control group who studied according to the usual method in the achievement test and inferential thinking skills

CHAPTER THREE / RESEARCH METHODOLOGY AND PROCEDURES:

First: Research Methodology : The experimental method was chosen for the purpose of achieving the goal of the research because it is the most appropriate in terms of accuracy and objectivity in the research results.

Second: The selection of the experimental design : The experimental design with partial control (experimental and control) with a post-test was chosen to include the research as an independent variable and two dependent variables, which are for achievement and inferential thinking as in Scheme (1) :

Scheme of the experimental design of the research

the group	parity	independent variable	dependent variable
Experimental	1. Chronological age in months 2. Raven IQ test 3. Previous achievement in science 4. Test the previous information.	Task Based Learning (TBL) Strategy	achievement test Inferential thinking test
Non-experimental		traditional teaching	

Third: The research community and its sample:

1. Determining the research community : The current research community consists of middle and secondary schools for boys for daytime study affiliated to the General Directorate of Education in Diyala Governorate / Baqubah District Education for the academic year (2020-2021).

2. Determining the research sample: The research sample was chosen by random assignment in Tariq Bin Ziyad Intermediate School for Boys, as two groups (two divisions) were chosen out of five classes for the first intermediate class, where group (A) was chosen to represent the experimental group of (37) students that will be studied according to The strategy of task-based learning (TBL), and group (B) to represent the control group, which numbered (37) students, which will be taught in the usual way, and no student failed in the class, and thus the sample size became (74) students :-

1. Chronological age: The ages of the students for the two groups were calculated in months using a t-test for two equal independent samples, then the arithmetic mean, variance and standard deviation were calculated. The results showed that there was no statistically significant difference between the two groups in this variable as shown in Table (1):

Table (1) The arithmetic mean, variance and standard deviation of the two research groups in the variable age

the group	number	arithmetic	variance	standard	T value	Statistical
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	the sample	mean		deviation	df	calculated	tabular	significance at 0.05
Experimental	37	163.33	62.333	7.895	72	1.009	1.993	NON-function
non-experimental	37	165.74	135.51	11.64				

1. Previous achievement in science: The students were equalized with their previous scores using the t-test for two equal independent samples. The results showed that there was no statistically significant difference between the two research groups in this variable. and as shown in Table (2):

Table (2) The equivalence of the students of the two research groups in the previous achievement variable in science

the group	number the sample	arithmetic mean	variance	standard deviation	df	T value		Statistical significance at 0.05
						calculated	tabular	
Experimental	37	69.861	203.01	14.248	72	0.367	1.993	NON-function
non-experimental	37	68.229	278.32	16.950				

2. Raven's test of intelligence: The equivalence between the students of the two research groups in terms of intelligence was achieved by applying the (Raven) test for the successive matrices, which consists of five different groups (A, B, C, D, E) and using the t-test for two independent equal samples. There is no statistically significant difference between the two research groups in the intelligence variable, and as shown in Table (3):

Table (3) The equivalence of the students of the two research groups in the intelligence variable

the group	number the sample	arithmetic mean	variance	standard deviation	df	T value		Statistical significance at 0.05
						calculated	tabular	
Experimental	37	28.194	62.323	7.890	72	1.164	1.993	NON-function
non-experimental	37	25.429	133.50	11.554				

3.Previous information: The researcher prepared a test for the previous information that includes (20) items of the type (multiple choice), and the test material consisted of the sixth grade science subjects, and by using the t-test for two independent equal samples, the results showed that there was no statistically significant difference between the two research groups. In this variable, as shown in Table (4):

Table (4) The students of the two research groups are equal in the previous information variable

the group	number the sample	arithmetic mean	variance	standard deviation	df	T value		Statistical significance at 0.05
						calculated	tabular	
Experimental	37	5.75	4.188	2.046	72	0.812	1.993	NON-function
non-experimental	37	5.85	4.180	2.044				

Sixth: Research requirements: The application of the research requires preparing the following requirements:

- 1. Determining the subject:** The subject was selected from the science book for the first intermediate grade.
- 2. Formulation of behavioral objectives:** formulated (169) A behavioral objective according to the cognitive levels (remembering, understanding, application, analysis) for Bloom's classification, then presented to experts and specialists in the field of science teaching methods as an appendix, to know their views on the accuracy and appropriateness of formulating behavioral objectives, where all behavioral purposes for acceptance with reformulation of some objectives without deleting, As in Table (5):

Table (5) Behavioral objectives are distributed according to Bloom's four levels of cognitive domain

Study content	level of behavioral purpose				Total
	Knowledge	Understanding	Application	Analysis	
chapter One	6	12	2	2	22
Chapter II	17	10	0	2	29

Chapter III	25	21	8	2	56
Chapter V	10	12	3	1	26
Chapter VI	12	20	2	2	36
Total	70	75	15	9	169

3.Preparation of study plans: (24) teaching plans were prepared for each group, and some modifications were made to the plans, and they were presented to experts specialized in methods of studying science, to see how comprehensive they are and achieve the purposes for which they were set..

Sixth: The research tools: In order to achieve the objectives and hypotheses of this research, the researcher built an achievement test and adopted a scale for inferential thinking:

First: The achievement test: An achievement test was prepared and the following steps were followed:

1.Determining the objective of the test: It is a measure of the academic achievement of first-grade intermediate students from the first five semesters specified in the research from the science book for the academic year (2020-2021).

2.Determining the test items: (30) multiple-choice test items were selected, and they were presented to experts and specialists in the methods of teaching science after they were briefed on the behavioral objectives, and all items were agreed upon without exception.

3.Preparing the specification table: The researcher prepared a specification table that represented the topics of the first five chapters that the researcher taught from the science subject for the first intermediate grade and the behavioral objectives of the first four levels within the cognitive domain of Bloom’s classification. The weights of the content of the topics were calculated in light of the number of pages of the book chapters as in the table (6) :

Table (6) Specifications table for the achievement test

Behavioral Purposes			Knowledge	Understanding	Application	Analysis	Total
seasons	number of pages	Relative importance	70 41 %	75 41 %	15 8 %	9 5 %	169 100 %
First	7	24%	3	3	1	-	7
second	5	17%	3	2	-	-	5
third	6	21%	3	3	-	-	6
fourth	5	17%	3	2	-	-	5
fifth	6	21%	3	3	1	-	7
Total	29	100%	15	13	2	0	30

4.Formulation of test items: The items of the achievement test were formulated according to the specification table and in the form of objective items, because together they provide an acceptable degree of honesty.

5.Test correction: Standards were set for test correction where each item has one (1) mark for the correct answer, and zero (zero) for the wrong answer.

6.The validity of the test: The validity of the test was confirmed in two ways:

First: Apparent honesty: It is for the test items to be closely related to what it is supposed to measure, and to present the test in its initial form to a group of experts or specialists to indicate the validity of the items, then a percentage of agreement (80%) or more was adopted to judge the appropriateness of the test items, then keeping the number of items fixed and thus was Verify the virtual validity of the test.

Second: Content validity: The specification table was built and presented to experts and specialists in the methods of teaching science, then an agreement percentage (80%) or more was adopted to judge the validity of the paragraphs of the achievement test, and then keeping the number of paragraphs fixed and thus the test became ready for application in its final form.

7. The exploratory application of the achievement test:

1. Determining the time and clarity of instructions : The researcher applied the achievement test to an exploratory sample consisting of (30) students of the first intermediate grade in (Al-Salam Intermediate School for Boys), and they were chosen by random method, and it was confirmed that all test items were clear, and the time taken to answer was calculated. About the test and it was (40) minutes.

2. Statistical analysis: The test was applied to a second exploratory sample in Al-Tirmidhi Intermediate School for Boys on non-sample first graders, and the number of the sample students was (100) students, and after correcting

the answers for the exploratory sample students, the students' answers were divided into higher and lower degrees statistically and included operations the following :

1. Difficulty coefficient: The number of correct answers was calculated for each of the objective paragraphs, then the difficulty equation was applied, and it was found that the difficulty coefficient for the objective test items ranged between (0.26 - 0.66), which is a good coefficient. (Al-Dulaimi , 2002)

• **Discrimination coefficient:** The ability of the item to distinguish individual differences between individuals who know the correct answer and those who do not know the correct answer for each of the test items. When calculating the discrimination coefficient for each of the test items using the item discrimination coefficient equation, it was found that the discrimination power ranged between (0.26 - 0.76).

• **The effectiveness of wrong alternatives:** After applying the alternatives effectiveness equation, it appeared that the alternatives had attracted a greater number of students in the lower group compared to the students of the higher group, and thus it was decided to keep the wrong alternatives as they are without change.

• **Test reliability:** It means that the choice gives the same results if it is repeated to the individuals themselves and in the same circumstances. The researcher has adopted two methods to calculate the reliability coefficient, as he chose to find the stability coefficient of the achievement test as a whole by adopting the Kewder Richardson equation, as it reached (90.0), and that The stability of the achievement test is very good (Al-Nabhan, 2004).

• **The final form of the achievement test:** After extracting the psychometric characteristics of the test consisting of (30) objective paragraphs of the type of multiple choice, and thus the test became ready for application in measuring the achievement of the experimental and control group students.

Second: The Inferential Thinking Scale: The researcher adopted the scale prepared by (Al-Dulaimi, 2014), which consists of (20) paragraphs and was applied to a sample of first-grade intermediate students, as he found an appropriate tool to measure the inductive thinking of the students of the research sample for the following justifications: The scale is characterized by ease and clarity. , suitable for first-grade intermediate students, and it is new in terms of time and satisfies the researcher's need to measure this variable, and it is characterized by a high degree of honesty, stability, discrimination and difficulty, and despite that, the researcher wanted to verify its sincerity and stability by doing the following:

1. Apparent honesty : In order to verify the apparent honesty, the researcher presented the scale to a group of arbitrators and specialists in the field of psychology, measurement, evaluation and methods of teaching science, and it was taken to accept all paragraphs with an approval rate of (80%) and above for the opinions of experts. As no paragraph was changed, so the apparent validity of the scale was verified.

2. Choosing a random sample to know the time, instructions, and stability of the inferential reasoning scale: The researcher conducted the test on Thursday (21/1/2021), and the sample consisted of (100) students from the first intermediate grade in the Salam Intermediate School for Boys, for the purpose of ensuring the clarity of the paragraphs and instructions of the scale And diagnosing ambiguous paragraphs and estimating the time it takes to answer the scale by recording the time of the first three students who completed the test and the time of the last three students, and by calculating the average time difference between the two cases, determine the appropriate time to answer the scale, which is (30) minutes. The results of the test showed the lack of students' inquiries on the scale items, which indicates their clarity, clarity and appropriateness of instructions. The stability was also calculated by Kewder Richardson's equation, as it reached (0.85), which is good stability. Therefore, the scale was counted as good, and the test became ready for application in its final form, consisting of (20) items.

Seventh: Procedures for applying the experiment:

1. The researcher applied the following tests and measures: the intelligence test (Raven), the prior information test, and the inferential thinking scale.

2. The research sample was taught on Sunday, corresponding to (24/1/2021), with three lessons per week for each group of the two groups. The research was conducted in the second course of the academic year (2020-2021), and ended on Tuesday (30/3/2021) The achievement test was applied on Wednesday (3/31/2021), and the Deductive Thinking Scale was applied on Thursday (04/1/2021).

Eighth: Statistical Means: The researcher used the statistical package (SPSS and Microsoft Excel) to perform the statistical operations, and the statistical operations included the following: arithmetic mean, variance, standard deviation and the second test (t-test for two independent equal samples, the difficulty coefficient, the discrimination coefficient and the effectiveness coefficient of the alternatives paragraphs achievement test Objectivity, coefficient of difficulty and coefficient of discrimination of test items for deductive reasoning, Cooper's equation, Kewder-Richardson coefficient, Pearson correlation coefficient, and Spearman-Brown coefficient.

NINTH: PRESENTATION OF RESULTS, DISCUSSION AND CONCLUSIONS , RECOMMENDATIONS, SUGGESTIONS :

RESULTS :

1. In order to verify the validity of the first null hypothesis, which states that: There is no statistically significant difference at the level of significance (0.05) between the average scores of the experimental group students who studied biology according to the task-based learning strategy (TBL) and the average scores of the control group students who studied biology according to the usual method in the achievement test for science) The post-achievement test was applied to the two research groups and processed the data and found the arithmetic mean,

variance and deviation, and the (-t-test) test was adopted for two independent equal samples - and the second calculated and tabulated value was found. As in Table (7):

Table (7) The arithmetic mean, variance, standard deviation and the calculated and tabulated T-value of the two research groups in the achievement test

the group	number the sample	arithmetic mean	variance	standard deviation	df	T value		Statistical significance at 0.05
						calculated	tabular	
Experimental	37	28.68	15.21	3.900	72	2.819	1.993	function
non-experimental	37	24.26	13.04	3.611				

It is clear from the above table that the average scores of the experimental group students in the achievement test are (28.68), the variance (15.21) and the standard deviation (3.900), while the average scores of the control group students are (24.26), the variance (13.04) and the standard deviation (3.611), and using the t-test equation (The t-test for two independent equal samples shows that the calculated t-value (2.819) is greater than the tabular value (2,000) at the significance level (0.05) and the degree of freedom (72), and this indicates the superiority of the experimental group students over the control group students in the achievement test, so it refuses The first null hypothesis and the acceptance of the alternative hypothesis, that is, there is a statistically significant difference between the mean scores of the experimental group and the mean scores of the control group in favor of the experimental group.

2. For the purpose of verifying the validity of the second null hypothesis which states that: There is no statistically significant difference at the level of significance (0.05) between the average scores of the experimental group students who studied biology according to the task-based learning strategy (TBL) and the average scores of the control group students who studied biology according to the usual method of science in the thinking test. Inferential) The dimensional inferential thinking scale was applied to the two research groups and found the arithmetic mean, variance and deviation, and the t-test was adopted for two independent equal samples and found the second calculated and tabulated value, as in Table (8):

Table (8)The arithmetic mean, variance, standard deviation and the calculated and tabular T-value for the two research groups in the inferential thinking scale

the group	number the sample	arithmetic mean	variance	standard deviation	df	T value		Statistical significance at 0.05
						calculated	tabular	
Experimental	37	11.87	8.898	2.983	72	2.159	1.993	function
non-experimental	37	10.58	8.102	2.846				

The above table shows that the average scores of the experimental group students in the inferential thinking test are (11.87), the variance (8.898) and the standard deviation (2.983), while the average scores of the control group students (10.58), the variance (8.102) and the standard deviation (2.846), and using the t-test equation (The t-test for two independent equal samples shows that the calculated t-value (2.159) is greater than the tabular value (2,000) at the significance level (0.05) and the degree of freedom (72), and this indicates the superiority of the experimental group students over the control group students in the inferential thinking test. The second null hypothesis is rejected and the alternative hypothesis is accepted, that is, there is a statistically significant difference between the mean scores of the experimental group and the mean scores of the control group in favor of the experimental group.

THE DISCUSSION :

1. Discussing the results of the first null hypothesis: It is clear from the results that the researcher reached that the task-based learning strategy made teaching interesting for students, and led to students' interest by providing stimulating intellectual activities and tasks, which helped stimulate learning, exchange of ideas as well as integration The interaction between the members of one group, which led to a sense of responsibility, and then searching and searching for information and facts, and then keeping this information, as well as the presence of feedback through dialogue after the end of the task and its modification across the groups, which led to raising the level of achievement.
2. Discussing the results of the second null hypothesis: the results showed that the task-based learning strategy focused on encouraging students to verbal communication, social interaction, dialogue, and exchange of opinions and ideas, which led to the formation of a state of cooperation between students and strengthening relationships in interaction and acceptance of the opinions of others, as well as Giving students the freedom to express their opinions and ideas through teamwork and the formation of a social climate that encourages the

development of manifestations of love and cooperation, which led to an increase in their level of deductive thinking.

CONCLUSIONS: In light of the current results, the current researcher reached:

1. There is a positive effect of the task-based learning strategy in raising the level of achievement of first-grade intermediate students compared to the traditional method.
2. There is a positive effect of the task-based learning strategy on raising the level of deductive thinking for first-grade intermediate students in comparison with the traditional method.

RECOMMENDATIONS: In light of the research results and conclusions, the researcher recommends the following:

1. The possibility of science teachers adopting the steps of the task-based learning strategy Teaching the academic content of all middle school classes.
2. Directing students' attention to the importance of inferential thinking that they lack for the purpose of benefiting from it and striving to master and develop it.

SUGGESTIONS: The researcher suggests the following to complement the research topic :

1. The impact of a task-based learning strategy Students have to do other dependent variables such as (correction of concepts, critical thinking, logical thinking) for science subject .
2. Conducting studies similar to the current research for other subjects such as chemistry and physics.

REFERENCES:

1. Al-Dulaimi, I. Alawi and Adnan. M. Al-Mahdawi. (2002): **Measurement and Evaluation**, 2nd Edition, Baghdad. Iraq : p 66.
2. Al-Dulaimi, N. N. Hassan. (2014): The effectiveness of teaching using the learning dimensions strategy in the achievement of first-intermediate-grade students in biology and their inferential thinking, **unpublished master's thesis**.
3. Ali, I. Ibrahim (2013): Logical inferences of the Iraqi teenager in accordance with the theory of cognitive advancement, **research presented to the Fifth Scientific Symposium on Thinking**, Teaching and Development Center, p: 7.
4. Al-Jawahiri, M. A. Haider (2015): The effect of ligamentous information processing strategies on the achievement of middle school students and their inferential thinking, **an unpublished master's thesis**, College of Education for Pure Sciences, p : 15.
5. Al-Jumaily, A. H. Ali (2014): The effect of planning organizations on acquiring Islamic concepts for second-grade intermediate students and developing their inferential thinking, **published Master's thesis**, : p 11.
6. Al-Nabhan, M. (2004): **The basics of measurement in the behavioral sciences**, 1st edition, P : 240.
7. Al-Saadi, H.H. Muhaisen (2020): **Effective Teachers, Teaching Strategies and Models**, 2nd Edition ,Al-Shorouk Library for Printing and Publishing, Diyala. p : 17.
8. Ardiyani, D. K. (2021) : **Implementing Task-based Learning (TBL) for Learning**, German in Indonesia, KnE Social Sciences, 5(3), 105–116.
9. Cooks, I. Abdullah (2021): The effect of the five-finger strategy on the achievement of first-grade intermediate students in science and their creative thinking, **unpublished master's thesis**, College of Basic Education, Al-Mustansiriya University, Iraq.
10. El-Sayed, S. M. Hassan (2010): The Effectiveness of Using the Task-Based Learning Strategy (TBL) in providing secondary school students in Saudi Arabia with some verbal communication skills in biology, **Egyptian Society for Scientific Education**,13 (5).p : 1-14.
11. Hamad, T. R. Ahmed (2017): The effect of employing the task-based learning strategy (TBL) in developing concepts and scientific communication skills for ninth grade students, **unpublished master's thesis**. P :261.
12. Hong. T. Ni, S & Qing. Z. (2010): **Developing critical thinking disposition by task-based learning in chemistry experiment teaching**. Procedia Social and Behavioral Sciences, 2 (2). 4561- 4570.
13. Huffman. F & Bray, N, W. (1996): **Task Factors individual Differences in strategy use of children**, ph. D. Department of psychology and Civitan International Research Center. Sc 313, University of Alabama at Birmingham.
14. Kazem, A. Jawad (2020): The effect of the cognitive acceleration strategy on the achievement and life skills of first-grade intermediate students in science, **unpublished master's thesis**.
15. Kearney, M. (2006): Prospective science Teachers as e-learning. **Australasian Journal of Educational Technology**, 22(2). P :229-259.
16. Khalaf, K. Balasem. and Fard. A. Hamza. (2018) : "The Effectiveness of the Pyramid of Preference Strategy in Acquiring Biology and Deductive Thinking Skills for Fourth Grade Female Students," published research, **Journal of the College of Education for Girls for Human Sciences**, 53.
17. Khashman, H. Ali (2019): The effect of the directed imagination strategy in developing some life skills for first-grade intermediate students in science, published Master's thesis, **Journal of Research of the College of Basic Education**, 15 (4).

18. Khawaldeh, A. S. Mahmoud (2016): **Language and Deductive Thinking**, 1st Edition, Dar Al-Hamid for Publishing and Distribution, p : 261.
19. Lee. J. (2000): **Tasks and Communicating in Language Classrooms**, Boston, USA. McGraw-Hill, p:32.
20. Maykhan, H. Adnan (2019): The effect of the information gap strategy on the achievement and social intelligence of first-grade students in the middle class in science, published Master's thesis, **AI-Professor Journal for Humanities and Social Sciences**, 59 (1).
21. Methods, (2013): **Task-Based Learning Programme d'éducation et de formation I tout au long de la vie** <https://www.languages.dk/archive/Methods/manuals/TBL/TBL%20UK.pdf>.
22. Murat Hismanoglu a, Sibel Hismanoglu, (2011) : Task-based language teaching: what every EFL teacher should do, a European University of Lefke, Gemikonagi, Turkish. *Procedia Social and Behavioral Sciences* , (15), p 46–52.
23. Printer, A. (2006): **Verbal Evidence of Task Related strategies child versus Adult Interaction System**, ERIC, 34 (4), 615-630.
24. Sholeh, M. B. (2020): Task-Based Learning in the Classroom for EFL Learners: A Review. *LINGUA: Jurnal Bahasa, Sastra, dan Pengajarannya*, 17(2), 124-134.
25. UK Essays, (2018): **Advantages and Disadvantages of TBL**. Retrieved from <https://www.ukessays.com/essays/english-language/some-advantages-and-disadvantages-of-tbl-english-language-essay.php?vref=1>.
26. Winnips, K. (6th September, 2005): **Self-Reliant Learning Online: Applying a Model for Task-Based Learning**, Workshop in a project funded by The Digi Tale University of the Netherlands, Retrieved April 24, 2016, from: <http://www.diguni.nl/zelfstandinglere>