

## **The effect of the mind's eye strategy on the achievement of second-grade students in science subject**

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### **Abstract:**

The research aims to identify the impact of the mind's eye strategy on the achievement of second-grade students in the intermediate science subject. The researcher adopted the experimental design with partial control for two equal groups, one experimental and the other controlling, and the research sample consisted of (70) female students from the second intermediate grade, with (35) female students for the experimental group, and (35) female students for the control group in (Al-Agras High School for Girls). The equivalence between the two research groups in a number of variables (chronological age calculated in months, prior knowledge test, Raven intelligence test) and (216) behavioral objectives distributed on the six levels of the cognitive domain of Bloom's classification were formulated. An achievement test consisting of 40 items of the multiple choice type was prepared as a research tool, after verifying the validity and reliability using the appropriate statistical means for the research, and after applying the tool to the two research groups, the data was compiled and it was treated statistically. The results showed the superiority of the students of the experimental group over the students of the control group in the achievement test for science. In light of the results, the researcher concluded a number of recommendations and suggestions.

**Keywords:** Mind's eye strategy, achievement in science

### **chapter one**

#### **Introduction**

##### **First, the research problem:**

The actual reality of science teaching is still characterized by stagnation, as it is based on indoctrination from the teacher and memorization from the learner, which led to the loss of the element of excitement and suspense for that subject. This, in turn, disturbs the learner and the teacher, as it causes frustration and lower achievement for the learner. It was confirmed by studies such as: the study (Kamel and Hanin, 2017) and the study (Al-Alwani, 2018), which confirmed that teachers use the usual method in teaching science. Students to think and motivate them towards the material, which made the learner feel bored and frustrated. This led to a decrease in the level of students' achievement.

The researcher found out that the problem still exists through the questionnaire that was distributed to middle school biology teachers. As it appeared that (85%) of science teachers confirmed that there was a decrease in the achievement of second-grade students in science, and they explained that the reasons for this decline are: vocabulary density, reliance on an ordinary teaching method that does not take into account individual differences among female learners, and the lack of means. Modern education, and that (15%) of them confirmed that there is no decline in the achievement of female learners. It also appeared that (100%) of them do not have any information about the dimensions of scientific enlightenment and its importance in academic achievement, and that there is a shortcoming in teaching that does not address the decline in science achievement in our middle schools. Hence, the researcher's research problem crystallized, and she sought to search for a teaching strategy in which she hopes to achieve effective learning that makes female learners enjoy activeness and participation in the educational process and increases their academic achievement in science. Based on the above, the research problem can be identified in answering the following question:

**(What is the effect of the mind's eye strategy on the achievement of second-grade female students in the middle school in science?)**

##### **Second: The importance of the study:**

The era in which we live is the era of the prosperity of science and technology, and it is characterized by rapid developments that accompanied scientific knowledge and technological applications. Thus, science in the modern sense has become a material, a method, and a means to confront the problems and challenges facing society (Al-Kaabi, 21: 2018).

Education is one of the effective means in achieving the strategic goals of society due to its importance in adapting and interacting with the local environment. It creates the appropriate conditions for the upbringing and preparation of citizens capable of advancing society and adapting them to changes in the environment and society (Bakkar, 2011: 32).

The curriculum represents the main field inside and outside the school, as it includes all the experiences that the learner goes through in the second intermediate grade from the science teacher, science subject, teaching methods, teaching aids, and modern strategies that the learner interacts with in the second intermediate grade to be under the umbrella of direct education. It is necessary to apply modern teaching strategies and methods in presenting concepts to learners to keep pace with the developments that occur in this era, which is characterized by the spread of knowledge and technology and the accumulation of various life problems (Al-Qara'a, 2015: 37). Therefore, there was a need to adopt strategies more related to the learner's life, interests and abilities to reduce the gap between what learners get within the classroom walls and the experiences gained from their surrounding environment. The learner today needs strategies that enable him to transfer scientific information, experiences and skills outside the confines of the classroom and the school environment (Abu Riash et al., 2009: 19).

Active learning strategies are among the strategies that emphasize the importance of learners building their knowledge through their interaction with their environment. In order to implement active learning, it is necessary to diversify its methods and strategies. The use of one strategy that can be applied in all educational situations is no longer effective. It has been long believed that the use of diversity increases learners' motivation and their education, positively affects their attention, and makes learners more receptive to learning. Diversification of strategies is key to enhancing learning (Atiya, 2018: 23). Among the active learning strategies is the Mind's Eye strategy. This strategy builds on the learners' ability to create mental images from texts by drawing their attention to key words in the text filled with images, encouraging them to anticipate things about the text based on the images they create, and providing the learners with an opportunity to process these images. Sharing their expectations with other learners through a product of their choice, prompting them to engage in active reading by testing their expectations in light of the actual text, and teaching them how to use picture-making on their own (Silver et al., 2009: 303-305).

In light of the above, we find that the mind's eye strategy makes the learner more observant of new ideas and concepts, as it is a strategy through which the teacher tries to stimulate learners' motivation to learn, in addition to that, the goal is the basic psychological principle that lies behind the mind's eye strategy is that the information that is stored in memory in more than one way, that is, through words, visual mental images, or any other sensory image that remains in memory and is easily accessible when needed and forms a more solid basis for future learning. As each learner in this strategy has the ability to reconsider his way of thinking to reach the optimal solution or the correct solution to the problem at hand. This leads to an increase in his ability and an increase in his academic achievement (Silver et al., 2009: 313).

Through the foregoing, the importance of the research is evident in the following:

1. Being the first research (to the knowledge of the researcher) at the local and Arab levels, which dealt with the impact of the mind's eye strategy on the achievement of second-grade students in the middle school.
2. The importance of the science subject for the second intermediate grade, as its contents enlighten the learner with facts, concepts and generalizations that contribute to understanding the material in an objective manner away from exaggerations and distortion.
3. The importance of modern strategies in the teaching process, including the mind's eye strategy.

**Third: Objective of the study:**

The research aims to identify the impact of the mind's eye strategy on the achievement of the second intermediate grade students in the achievement of science.

**Fourth: Hypothesis of the study:**

In light of the research objective, the researcher formulated the following null hypothesis:

There is no statistically significant difference at the level of significance (0.05) between the average scores of the experimental group students who will study science according to the mind's eye strategy and the mean scores of the control group students who will study according to the traditional method in the achievement test.

**Fifth: Limitations of the study:**

The study is limited to:

1. Spatial limits: Intermediate and secondary day schools for government girls affiliated to the General Directorate of Education in Diyala Governorate.

2. Time limits: the first semester of the academic year (2021-2022).
3. Human limits: a sample of second-grade intermediate students.
4. Cognitive limits: Science book for the second intermediate grade, written by Daoud, Hussein Abdel Moneim and others (2020), 3rd edition, General Directorate of Curricula, Ministry of Education, Republic of Iraq.

**Sixth: Terms Definition:**

1. The effect was known:

-As: "the outcome of a desirable or undesirable change that occurs in learners as a result of the learning process" (Al-Obaidi, 2018: 23).

-The researcher defines it procedurally as: the amount of change that the mind's eye strategy makes in the learning outcomes of the second intermediate grade female students in science, and it is measured by the ETA square equation by identifying the increase or decrease in their average grades in academic achievement and enlightenment.

2. The mind's eye strategy was known:

- as: "The ability to form mental images from the material to be studied, as the ability to see the text is through its discovery in the mind by creating or drawing mental images so that it describes their response to the subject" (Sekolah, 2017: 63).

Theoretical definition of the Mind's Eye strategy: a strategy that develops learners' reading skills to make them distinguished readers, by exploiting the large stock of images stored in the learners' memory to develop their abilities to transform the read texts into realistic situations.

The researcher defines it procedurally as: a strategy that aims to provide the students with the opportunity to process images and share their expectations with their colleagues through a product they choose and push them to engage in reading activities by choosing words in the light of the actual text, and its purpose is to help female learners increase their academic achievement and provide them with information and skills To reach a link between the topics of the lesson.

**Chapter II**

**Theoretical background and previous studies**

**First, the constructivist theory:**

During the past two decades, educational research witnessed a major shift in its vision of the teaching and learning processes, i.e. a shift from focusing on external factors that affect learner learning, such as: teacher variables (character, enthusiasm, and style), learning environment, curriculum, learning outcomes, and other factors. , to focus on the internal factors that affect the learner, especially what is going on inside the mind of the learner, such as: his previous knowledge, his ability to process information, and his motivation to learn. This transformation was accompanied by the emergence of the so-called constructivist theory (Al-Nubi, 2016: 37), as the constructivist theory is one of the relatively recent theories in learning, and is based mainly on Piaget's theory of learning and his view of the human mind. The search for a specific meaning or definition of constructivism is problem. There is no specific definition of constructivism that contains within it its concept of meanings or psychological processes. Therefore, there are many and varied definitions of constructivism in educational writings. However, it can be divided into two main parts: (Constructivism is seen as a theory of knowledge, as the learner builds his knowledge by himself, meaning that knowledge is only a personal construction, and among the supporters of this definition, Sigel, Stephen Ierman, Von Glasersfeld, and they agree that constructivism It refers to the process of mental construction, while the other section looks at constructivism as a theory of learning that stresses that the occurrence of learning requires the learner to build or reconstruct his mental plans by means of certain mental processes, and the most important proponents of this definition, Windschittl, Andre, James rauff, and they agree that Constructivism is a psychological theory that assumes that science occurs as a result of the generation of meaning personally through the experiences that the learner goes through, whether they are individual experiences or joint experiences, and what a person knows in advance and prepares for new situations changes the information he receives or gets rid of it completely) (Dwayne, 2015: 9) .

**Second: Active learning**

The learner does not learn just by sitting in the classroom, listening to what the teacher says and memorizing it or answering his questions, but he learns when he participates in the educational situation, talks about what he learns in that situation, writes about it and relates it to his previous experiences, and applies it during his daily life and makes what he learns part of itself. In a clearer sense, he becomes an active literate person responsible for his learning process (Ramadan, 2017: 19).

Active learning is a means of educating learners so that they go beyond their role of passive listening so that the learner takes some direction and initiates the implementation of activities in the classroom. It is with that learning that directs learners in positive directions that will allow them to discover and work with others to understand the curriculum by forming small groups for discussion,

role-playing, project work, and asking questions, to ensure that learners in the learning process teach themselves by themselves and under the supervision of their teachers. Abu Al-Hajj, 2017: 25).

Active learning emphasizes the active participation of the learner in the learning process taking place, so that he is an active processor of the information he receives, and works with it within his daily life and not a passive future. Active learning is a form of learning, in which learners participate in some activities that prompt them to think and reflect on the information provided to them and the way they will follow when using this information (Saada, 2018: 32).

#### :Active Learning Strategies

The multiplicity of teaching strategies that suit active learning is due to the fact that active learning depends on the learner's activity and effort during his learning, as it is the focus of active learning that works to learn and his colleagues participate in his learning. Hence, the teaching strategies that are appropriate for active learning are numerous (Atiya, 2018: 22), and the researcher will present some of the active learning strategies according to a scheme, and focus on the mind's eye strategy because it is related to the current research topic.



Scheme 1: Active Learning Strategies (prepared by the researcher)

#### **Mind's Eye Strategy:**

The Mind's Eye strategy works on developing students' reading skills, to make them distinguished readers, by exploiting the large balance of images stored in the learner's memory (acquired through their daily experiences) in developing their abilities to transform readable texts (that do not include images) into realistic situations, Or characters, or dynamic scenes, thus building the strategy (Mind Eye) on creating mental images from texts through:

1. Attract their attention to keywords in the text filled with images.
2. Encouraging them to anticipate things about the text on the basis of the images they create.
3. Allow students to process these images, and to share their expectations with other students;

And that through the product of their choice.

4. Encouraging students to engage in reading activities, by testing their expectations in the light of the actual text.

5. Teaching them how to use making pictures on their own.

The mind's eye strategy is used to increase effective reading skills that help learners know how to read non-picture cognitive texts, and transform them in a creative mental way into dramatic scenes, so that these scenes consist of mental images stored in their memory; This makes the reading textual knowledge active, attractive, and meaningful to the learner. It is characterized by the fact that it depends on the learner's effort and his self-activity in imagining the key words of the text, and linking them in a meaningful way that pertains to the text, and accordingly, the mind's eye strategy is used effectively and significantly in the lessons of a declarative cognitive nature.

(Al-Nazir and Salih, 2018: 183)

**Second: The relationship between the mind's eye strategy and the results of research related to active learning:**

The general benefits of the mind's eye strategy in reading comprehension appear through three distinct research directions

1. Research related to the competent reader: where it revealed that the ability to create mental images is one of the key reading skills that competent readers use automatically, as they use their previous knowledge, to form expectations about the text being read, and these two skills can be trained on students in a short time.

2. Double coding research: It has confirmed that storing information in two ways (through language, through images), makes learning deeper, and makes it easier to remember, and teaching students how to construct mental images activates and develops their abilities to reason, predict and remember what they have read.

3. Field research: confirmed that developmental and therapeutic reading programs based on binary coding lead to an increase in reading comprehension in schools (Al-Nazir and Saleh, 2018: 184)

**Third: Steps of the Mind's Eye strategy in the classroom**

1. Determining the topic of the lesson and the teaching objectives.

2. Selecting the various educational tools and aids that you will use in presenting the information.

3. Selecting the text to be read and then choose (20-30) key words or phrases from it.

4. Explaining to the learners the nature of the strategy by reading words or phrases from the lesson in a clear voice. They must form a mental picture of the word, or ask a question about it, or expect something, or describe their feelings when hearing it.

5. Reading the words to the students carefully (word by word). Let the reading be accompanied by emotional expressions. Then ask them to visualize movies or mental pictures while reading the words, modify their pictures and add to them with each new word.

6. Putting the students into pairs or small groups to share and develop their final products.

7. Directing the students to read the text (lesson) and compare their first thoughts with what they discovered during reading.

8. Encouraging students to reflect on the process and thinking patterns they prefer (visual visualization, posing a question, exploring feelings, anticipating).

9. Teaching learners how to use the strategy on their own. Hey (Silver et al., 2009: 293).

**The second axis: previous studies:**

After reviewing the previous studies and literature on the research variables, the researcher did not obtain any local study on the mind's eye strategy, except for one global study on (the mind's eye strategy) as an independent variable.

**•The study of (Sekolah, 2017):**

The effect of the mind's eye strategy to improve students' reading comprehension in the second year of students in the United States of America

This study was conducted in the United States of America and aimed to identify the effect of the mind's eye strategy to improve the reading comprehension of students in the second year of students in the United States of America. The researcher followed the quasi-experimental approach on a sample of (64) students divided into two groups, one experimental group consisting of (32) students and the other control group consisting of (32) students. The researcher prepared tests for the equivalence of the research sample (chronological age, previous information, intelligence test). One of the most important results of the study: There are statistically significant differences in the pre and post application of the experimental group with regard to improving students' reading comprehension, and it can be concluded that there is a significant difference in using the mind's eye strategy to improve students' reading comprehension (Sekolah, 2017: 60).

**Chapter III**

**Method of the study and Procedures**

First: Method of the study: The researcher followed the experimental method to achieve the goal of the research, because it is one of the most accurate and efficient scientific research methods.

Second: Experimental Design: The researcher used the experimental design with partial control for two equal groups, one experimental and the other a control, and the scheme (4) illustrates this:

Scheme (2) Experimental design of the study

Test	Dependent variable	Independent variable	Equivalence	Group
Achievement test	Academic	Mind's eye strategy	The chronological age of the students	Experimental

	achievement	the usual way	(in months).	control
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**Third: The research community and its sample:**

**1. Community of the study:**

The research community is represented in the intermediate and secondary morning schools for girls in Diyala Governorate / Baqubah District for the academic year (2021 AD - 2022 AD), in which the number of people in the second intermediate class is not less than two divisions.

**2. Sample of the study:**

The researcher chose a secondary school (Al-Agrass High School for Girls) as an intentional sample.

**Fourth: Equality of the two groups:**

An equivalence was made between the two research groups in some variables that may affect the course of the experiment, despite the fact that the female students of the research sample are from very similar social and economic milieu, and they study in the same school. The variable data (first and second) were obtained from the school records with the help of its administration, and the following is an explanation of the statistical equivalence processes in the variables between the two research groups:

Table (1): The results of the two research groups in the equivalence of some variables

sig	T value		Df	S.D	Mean	No	group	variable
	Tabular	Calculated						
Not significant	2.000	0.53	68	7.76	172.86	35	Experimental	age
				8.45	173.89	35	control	
	0.623	3.14		14.89	35	Experimental	Previous achievement of the students	
		2.99		14.43	35	control		
	1.838			3.73	30.86	35	Experimental	IQ test
				3.94	29.17	35	control	
				4.74262	27.5143	35	control	

**Fifth: Controlling the extraneous (non-experimental) variables:**

Despite verifying the equality of the two research groups in some variables that are believed to affect the accuracy of the results, he tried to avoid the impact of some extraneous variables in the course of the experiment. Here are some of these variables and how to control them:

1. Selection of the sample members: One of the factors that affect the research results is the way in which the research sample is chosen, so the researcher tried her best to avoid this variable in the research results, by conducting statistical equivalence between the two groups in the research variables.

2. Associated Accidents: The research experiment was not exposed to any accident that hindered its functioning, so this factor could be avoided.

3. Experimental extinction: None of the female students was absent during the course of the experiment except for some natural absences, as this factor did not have any effect on the course of the experiment and its results.

4. Measurement tools: The researcher maintained the control process for the tools used in the experiment.

5. Experimental procedures: Some experimental procedures that could affect the course of the experiment have been identified, as follows:

a) School of the subject: The researcher herself studied the two research groups (experimental and control).

b) Research confidentiality: The research was kept confidential in agreement with the school administration and the subject school by not informing students of the nature and purpose of the research.

c) Classes distribution: The researcher adopted the weekly schedule applied in the school without changing it, as the researcher studied six classes per week, three classes per group, and Table (2) shows that:

Table (2): Distribution of science classes (biology) between the two groups

Lesson	Group	Day
the first	Experimental	Tuesday
Second	control	
the first	control	Wednesday
Second	Experimental	
the first	Experimental	Thursday
Second	control	

d) Teaching aids: The teaching aids were somewhat similar between the two groups.

e) Study subject: The study subject included in the experiment was unified for the two groups.

**Sixth: The study Requirements:**

Before applying the experiment, it is necessary to prepare the basic requirements for the experiment, which are:

1 .Determining the scientific subject: The scientific subject that will be taught to the students of the two research groups was determined during the experiment period. The scientific subject included the four chapters of the science book (Biology) for the second intermediate grade, and table (3) shows that:

Table (3): The semesters to be taught during the trial period

Pages	Chapter Contents	Chapter
87 - 91	Lesson One: The Kingdom of Vanguards	Seven: simple living things
92 - 98	Lesson Two: The Kingdom of Fungi	
100 – 105	Lesson 1: Algae and seedless plants	Eighth: The Kingdom of Plants
106 – 113	Lesson Two: Seed Plants	
115 – 119	Lesson One: Invertebrates	Ninth: the animal kingdom
120 – 129	Lesson Two: Vertebrates	
132 – 135	Lesson One: The Ecosystem	Tenth: The environment and its components
136 – 143	Lesson Two: Cycles of the Elements in Nature	

2.Formulation of behavioral objectives: (216) behavioral objectives have been formulated based on the six levels according to Bloom's classification: (remembering, understanding, application, analysis, synthesis, and evaluation.)

3. Preparation of Teaching Plans: The researcher prepared (48) teaching plans by (24) teaching plans for the experimental group according to (the mind's eye strategy) and (24) teaching plans for the control group according to (the usual method).

**Seventh: Search instruments:**

The following are the steps for constructing the achievement test:

a. Determining the objective of the test: The achievement test aims to measure the achievement of the second intermediate grade students (the research sample).

b. Determining the number and type of test items: The researcher identified the test items with (40) items from objective tests of the multiple-choice type, and each item contains four alternatives.

c. Preparing the specification table: The specification table was prepared to build the achievement test according to the following steps:

1. Finding the relative importance of one chapter in relation to the other chapters according to the number of pages of each chapter in relation to the number of pages of the entire article:

The relative importance of one chapter =Number of pages per chapter/The total number of pages for the five chapters× 100%

2. Determining the relative importance of the behavioral goal at each level and for each of the four seasons according to the following relationship:

The relative importance of the behavioral goal= Number of behavioral goals per chapter /The sum total of the behavioral objectives for the five chapters× 100%

3 .Determining the number of questions for one content using the following equation:

The number of questions in each cell = the relative importance of one chapter x the relative importance of the behavioral goal of one chapter x the total number of questions

(Al-Mahasna and Abd al-Hakim, 2013: 115)Table (4) shows that

Table (4): Specifications table for the achievement test

Total	percentage of behavioral goals						Relative importance	Page numbers	Chapters
	التقويم	Composition	Analysis	Application	understanding	Remember			
%100	%3	%3	%5	%16	%22	%51			
12	1	1	1	2	2	5	%26	10	seventh
12	1	1	1	2	2	5	%26	10	eighth
10	صفر	صفر	1	1	2	6	%28	11	ninth
6	صفر	صفر	صفر	1	1	4	%20	8	The tenth
40	2	2	3	6	7	20	%100	39	the total

d. Correction of test answers: After the test items have been formulated, the test type has been selected, and the test has been placed in its initial form, consisting of (40 test items). A standard was set for correcting the answers, as (one score for each correct test item) and (zero for the wrong answer, and the left item that the student did not answer, the item for which more than one choice was set), and in conclusion, the overall higher score for the achievement test is (40 degrees). The lowest score (zero).

e. The validity of the test: the apparent validity and the validity of the content were extracted as follows:

- Apparent honesty: The achievement test was presented to a group of specialists in education and science teaching methods, so the test items were kept (40.)

- Content Validity: The test items are representative and comprehensive of the academic content, by relying on the specification table.

**The exploratory application of the achievement test:**

The achievement test was applied exploratory in two stages:

- The first exploratory application: The achievement test was applied in its first exploratory stage on Tuesday (4/1/2022 AD) on (30) female students of the second intermediate grade at (Rehana Al-Rasoul High School for Girls), and its purpose was to know the clarity of the test instructions and instructions. And the extent to which its paragraphs were understood and clear to the students and the time period required for it was calculated. The average response time for the test paragraphs was reached by calculating the average time for students' response, and it was (44) minutes by recording the time on each student's answer sheet upon completion of the answer, and the following equation was used In extracting the response time:

Time mean=The first student's response time + the second student's response time +.../ total number of students

Time mean = 1320/30 = 44 minutes

**Second exploratory application:**

The objective of analyzing the test items is to improve the test by identifying the shortcomings in its paragraphs and detecting weak items and treating them or excluding the invalid ones. The score was (40) Supplement (12), as the test was applied to a sample of (100) female students in the second intermediate grade at (Umm Al-Qura High School for Girls) on Wednesday (5/1/2022 AD) after making sure that they completed the course. Its purpose was to statistically analyze the items of the achievement test to obtain the psychometric characteristics of the test, which are the difficulty of the item, item discrimination, and the effectiveness of the wrong alternatives.

1 .Difficulty coefficient: When the researcher calculated the difficulty coefficient for each of the test items, he found that it ranged between (0.54 -0.78).



2 .Discrimination coefficient: When calculating the discrimination power of each of the test items, it was found that it ranges between (0.26-0.59).

3. The effectiveness of the wrong alternatives: After calculating the effectiveness of the incorrect alternatives, it was found that it was limited to (-0.04-0.3).

- Test reliability: The researcher verified the reliability of the test by:

- Fragmentation: The stability was reached using the Pearson correlation coefficient (0.74), then corrected by the Spearman-Brown equation, and it reached (0.85).

(0,71).

**Ninth: Statistical means:** The researcher used the SPSS statistical program. In the research procedures and statistical analysis of its data:

**the fourth chapter**

**Presentation and interpretation of results**

First: Presentation of the results: After applying the post-achievement test and obtaining the scores of the two research groups, Annex (16) and in order to verify 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 group's students The experimental group that studied science according to the mind's eye strategy and between the average scores of the control group students who studied according to the usual method in the achievement test for science) and as shown in Table No. (5)

Table (5)

The results of the T-test for the post-achievement test scores for the two groups

Sig 0.05	t value		df	S.D	Mean	No	Groups
	Tabular	Calculated					
significant	2,000	3.243	68	5.45	33.26	35	Experimental
				6.31	28.69	35	Control

It is evident from the above table that the mean scores of the experimental group students in the achievement test are (33.26) and the standard deviation is (5.45), while the mean scores of the control group students are (28.69), and the standard deviation is (6.31), using the t-test equation for two independent samples. It shows that the calculated T-value (3.243), which is greater than the tabular value at the level of significance (0.05) and the degree of freedom (68), which is equal to (2,000), and this means that there are statistically significant differences in favor of the experimental group.

Statement of the effect size of the independent variable in the first dependent variable (achievement): The researcher used Cohen's equation to extract the effect size (d) for the independent variable in the dependent variable, and the effect size was (d) (0.55) and by reference to Cohen's classification Table (6) ) It is clear that the effect size was medium.

Table (6): The effect size of the independent variable on the achievement variable

Level	The effect size	dependent variable	independent variable
Medium	0.05	achievement	Mind's eye strategy

The researcher adopted the gradation set by Cohen (Cohen 1988), and Table (7) shows that:

Table (7): Effect size and effect values according to Cohen's classification

(0.8) and more	(0.4 : 0.7)	(0.2 :0.4)	The effect size
Large	Medium	small	Level

(kiss, 1996: 164)

**Second: Interpretation of the results:**

1.Interpretation of the result related to the first hypothesis:

a) Using the mind's eye strategy rids students of traditional methods that do not take into account individual differences and works to make students learn in cooperative groups, in addition to being working on building knowledge based on previous mental perceptions, which makes the learning process meaningful so that it helps to understand, store and recall the parameters Effectively linking prior knowledge with current knowledge in the lesson.

b)It helped the students' attention intensity by stimulating the senses such as observation, concentration and imagination, and delivering the scientific material to their minds as a modern method that the students had not known before, which helped in increasing the scores of the achievement test and this is consistent with what was confirmed by the double coding research which indicated that the process of storing information takes place in two ways (Through language, through pictures), which makes learning deeper, and makes it easier to remember, and teaching students how to build mental images activates and develops their abilities to infer, predict and remember what they have read.

**Third: Conclusions:**

In light of the findings of the research, the following can be concluded:

1. Teaching using the mind's eye strategy led to an increase in the achievement of second-grade female students in the middle school in science (biology).

**Fourth: Recommendations:**

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

1. Holding training courses for science teachers in general and biology teachers in particular to find out about new methods, methods and strategies for active learning and to develop their skills in it,

2. Adopting the use of the mind's eye strategy in teaching science to second year intermediate students due to its effectiveness in raising achievement.

**Fifth: Suggestions:**

To complete this research, the researcher suggests conducting the following research:

1. The effect of the mind's eye strategy on the achievement of biology and other academic stages.

2. The effectiveness of the mind's eye strategy in acquiring biological concepts for the fifth grade of primary school

3. The effectiveness of the mind's eye strategy in other variables such as creative thinking, contemplative thinking, critical thinking, and immediate and delayed achievement.

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