

## The effect of guided imagination strategy using Google Classroom on achievement and imaginative thinking skills of biology among scientific fourth graders

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### Abstract:

The aim of the current research is to identify (the effect of the guided imagery strategy using Google Classroom on the imaginative thinking skills of biology among fourth-grade students of science) the researcher adopted the partial-controlled experimental design to achieve the goal of the research, and the current research is limited to fourth-grade students in science and in secondary schools the official affiliate of the Ministry of Education, Third Rusafa, in Baghdad Governorate for the academic year (2021-2020) and Zahrat Al-Rabea High School for Girls was chosen to be its students as the research sample intentionally. Then four halls were chosen from a total of 17 halls to organize two divisions of students of the fourth grade of science, one experimental and the other controlling, as the research sample reached (68) students, of (34) female students in the experimental group and (34) female students in the control group, the researcher was rewarded with the two research groups in the variables (IQ test, chronological age, biology subject scores in the third grade final test, previous bioinformatics test, imaginative thinking skills test), and the scientific subject was defined in the following chapters (classification of living organisms, ecology and ecosystem science, The food chain and the cycle of elements in nature, factors affecting the environment, the adaptation of animals to the environment) from the book on biology to be taught for the academic year (2021-2020) AD, the behavioral objectives of these classes were formulated and amounted to (150) behavioral objectives similar to the six levels of Bloom's classification in the cognitive domain (remember, comprehend, apply, analyze, synthesize, evaluate) according to the proposed lessons for each semester, and then the teaching plans were prepared for the two groups, as The researcher taught the two research groups by herself during the period of the experiment that lasted (10) weeks of the second semester of the academic year (2021-2020), As for the research tools, the researcher prepared a test for imaginative thinking skills consisting of (13) questions, and the validity of the tool was verified by presenting it to a group of arbitrators, and it was applied to the two survey samples, one of them to know the time of the answer and the extent of clarity of the paragraphs and the other one is for the purpose of analyzing the test items statistically to extract the effectiveness of the wrong alternatives, the difficulty factor, the ease and distinction coefficient, and extract the stability for the two tests.

**Keywords:** guided imaginative strategy, Google Classroom, achievement, imaginative thinking skills

### First: the research problem

Through the researcher's discussion with my teachers of biology, I noticed that there is a weakness in improving thinking skills in general and imaginative thinking in particular in the educational process, and that the teachers did not focus on training their students in performing this type of process during teaching, and their limited use of modern teaching methods, the current conditions that the whole world is going through due to the spread of the Corona pandemic and the inability of students to keep up with the official working hours on a daily basis has led to the necessity of employing technological means in the educational process, and therefore the researcher used an educational platform adapted to the current situation, which is the Google Classroom platform.

The researcher prepared an exploratory questionnaire Appendix (3) after she obtained a book on facilitating the task of Appendix (2) in order to survey the opinions of a random sample of teachers of biology for fourth-grade scientific students distributed among multiple schools of the Ministry of Education / Rusafa Third Directorate in Baghdad

with no experience Less than five years old and their number (10) teachers, and after obtaining the answers, the following is revealed:

- 95% of the teachers do not have knowledge of the guided imagery strategy.
- 90% of the teachers indicated that the approved method in teaching is the traditional method (memorization and indoctrination).
- 80% of the teacher's opinions indicate the existence of activities that develop students' imaginative thinking skills.
- 90% of the teachers' opinions indicate the low achievement of students in biology.
- 85% of the teachers' opinions support the use of Google Classroom in the educational process.

From the above, the researcher believes that there is a need to keep up with modern teaching strategies as a result of the students' intellectual development, as it has become important to be familiar with everything new in the education process, and accordingly the researcher sought to use a modern strategy of active learning strategies, which is the guided imagery strategy using Google Classroom, in addition, the guided imagery strategy was not adopted in the teaching of biology for the fourth scientific grade in any previous study according to the researcher's knowledge. From here, the research problem arises with the following question:

**What is the effect of guided imagination strategy using Google Classroom on the achievement and imaginative thinking skills of scientific fourth graders?**

**Second: The importance of research:** The importance of research can be summarized as follows: -

1. Using the strategy of guided imagination in response to recent trends in teaching due to the necessity of adopting modern teaching methods in teaching biology.
2. The necessity of using Google Classroom to keep pace with technological progress and to support the educational process.
3. Knowing the effect of guided imagery strategy using Google Classroom on the imaginative thinking skills of scientific fourth graders.
4. Providing complete and complete information about the guided imagery strategy that helps life sciences supervisors in training teachers to use a modern strategy in educational courses.
5. Providing a test for imaginative thinking skills, the first of its kind at the level of Iraq (to the knowledge of the researcher) to measure the imaginative thinking skills of fourth-grade students.

**Third: Aims of the Research**

The research aims to identify (the effect of guided imagery strategy using Google Classroom on the imaginative thinking skills of fourth graders of science).

**Fourth: Hypothesis of the Research**

There are no statistically significant differences at the level of (0.05) between the arithmetic average of the scores of the experimental group students who study according to the guided imagery strategy using Google Classroom and the arithmetic average of the scores of the control group students who study according to the traditional method of using Google Classroom in measuring imaginative thinking skills.

**Fifth: Limitation of the Research**

1. Human limits: - Female students of the fourth grade of biological sciences in the Spring Flower High School for Girls.
2. Knowledge limits: - The academic content within the vocabulary to be taught in the first semester of the first course, namely (classification of living organisms, ecology and ecosystem, the food chain and the role of elements in nature, factors affecting the environment, the adaptation of animals to the environment).
3. Time limits: - The semester of the first course of the 2020-2021 academic year.
4. Spatial limits: - The General Directorate of Education in Baghdad / Rusafa / Third.

**Sixth: Defining of terms**

1. A guided visualization strategy

- (Mohidat, 2019) as: "The process of using the abilities of the mind in imagining and visualizing various topics and events as it helps students form mental images related to the topic of the lesson" (Mohidat, 2019: 156).

2. Google Classroom

- ((DiCicco, 2016) as: “An electronic application that includes many Google services such as files uploaded to the cloud, e-mail, Google forms to create tests, questionnaires, and old Google offers, and it provides the opportunity to create virtual classrooms through which it is possible to view the educational material, activities, tasks and assignments, and obtain Instant feedback for students by entering the program from anywhere in the real world classrooms or homes (DiCicco, 2016: 21).
- The researcher defined it procedurally that it is a free educational service that makes it easy for students and teachers to communicate inside and outside schools, as well as facilitating the establishment of electronic classes and the distribution of tasks among students, teachers can add students directly or by sharing the join code, it is also easy to use anytime and anywhere.

### 3. Imaginary thinking skills

- (Suleiman, 2010) defined it as: “the individual's ability to perform quasi-sensory or semi-perceptual mental processes that he is aware of with his self-awareness, through which the previous sensory experiences are reconstructed and stored in memory in order to produce a mental image that may be similar to or different from its sensory or perceptual counterparts. (Suleiman, 2010: 334)
- The researcher defines it procedurally as the level of performance of students of the Fourth scientific grade, biological in the ability to imagine after completing the teaching of the contents of biology, and it is measured by the grades that the student obtains in the test prepared by the researcher.

## Chapter two: The theoretical framework and previous studies

### Guided Imagery Strategy

He defined it (Al-Jadba, 2012) as the strategy in which an imaginative scenario is formulated that takes students on an imaginary journey and urges them to build a number of mental images or meditate on a series of events that are read to them by the teacher integrating sight, hearing, emotions and feelings (Al-Jadba, 2012: 8). (Al-Amraji, 2017) defined it as mental images that are formed in the human mind, which help to describe, analyze and link phenomena, situations, facts, events, facts, and time with a symbol or a word or a simple structure, as it works on students' understanding and application (Al-Amraji, 2017: 9). (Al-Harashseh, 2014) defined it as a cognitive teaching strategy that directs mental images to students about a specific activity and this results in new knowledge structures and is expressed through oral discussion or drawing (Al-Harashseh, 2014: 193).

#### ❖ Advantages of the guided imagination strategy:

- 1- It stimulates students to generate a special mental image about the subject of the lesson.
- 2- Students develop direct mental images about concepts and ideas that help them remember information.
- 3- This technique is stimulating and useful for students, as the student becomes more prepared before the lesson is presented by the teacher.
- 4- Suitable for all school content and for any educational stage.
- 5- It makes visual students more effective during reading. (Al-Shammari, 2011: 110)

#### ❖ Google Classroom

It is a free web service developed by Google for schools and universities that aims to simplify assignment creation, distribution, and correction, and to share assignments between teachers and students (Heggart, 142: 2018).

(Hassan, ather, 3300: 2020) defined it as an easy-to-use and free official educational platform used in the educational environment, it was chosen in the educational process management due to its compatibility with the International Society of Technology in Education Standards (ISTE) International.

- ❖ The skill of imaginative thinking: Imagination embodies the ability to innovate, innovate, break out of the ordinary, raise the level of thinking, and train to help increase the ability of creativity and unconventional thinking, and imaginative thinking skills are a basic requirement that students are requested to teach in early stages of their lives, and that imagination skills are a wide field for research And remembrance (Al-Atoum, 2016: 29).

Al-Batthani (2018: 17), citing (Solso, 2000) and Liang & Chang, 2012) indicated that the skill of imaginative thinking is the ability of the individual to represent visual images and create new relationships between experiences, form mental images and transform them into new forms and imagine existing things or It does not exist, and

organizing new images that the imagined has no previous idea about, and building new relationships between experiences

**Second / Previous studies**

Study (Al-Hashemi, 2016): To identify the effect of the guided imagery strategy on the achievement of the subject of environmental science, pollution and reflective thinking among students of the second stage in the College of Basic Education, to identify the effect of the analog thinking strategy on the achievement of the subject of ecology, pollution and reflective thinking among the second stage students of the College of Education the basic, as the researcher adopted the experimental design, the research sample was represented by students of the College of Basic Education, who are (21) students in the control group, and (22) students from the experimental group, and the research included two tools, namely an achievement test and a measure of reflective thinking, the data were analyzed using SPSS and t-tests, and the results showed the superiority of the experimental group over the control group in the achievement test and imaginative thinking skills.

**Chapter three**

**First: Experimental Design:**

It is an intentional and controlled change of the specific conditions of an event, noting the changes occurring in the same event and their interpretation (Melhem, 2002: 422).

As the researcher adopted the experimental approach in her research procedures of partial control and post-test for students 'achievement in biology and imaginative thinking skills, the research also includes two groups, the first experimental group consisting of group (A) and group (E) that are exposed to the independent variable (the wave imagery strategy using Google classroom) and the second group is a control consisting of two groups (C, D) that were not exposed to the independent variable, but they were exposed to the Google classroom. Diagram (1) illustrates the experimental design used in the research:

S	Group	Parity	Independent variable	Dependent variable
1	Experimental	1. The chronological age of students is calculated in months 2. IQ test. 3. Examining previous bio-information.	Guided Imagination Strategy	1. Acquiring biology course. 2. Imaginary thinking skills.
2	Control	4. Academic achievement of the third grade intermediate in biology 5. Test imaginative thinking skills.	The usual way	

**Second: - the research community and sample**

A- Research community: The research community includes students of fourth grade science for governmental preparatory and secondary schools for girls in the General Directorate of Education in Baghdad Governorate Rusafa Third for the academic year (2020-2021), and their number (1739) students according to the writer issued by the Educational Planning Department in the directorate of Rusafa third.

**The research sample:** - The researcher chose Spring Rose Prep for Girls affiliated to the General Directorate of Education Rusafa / Third as a research sample with intentional appointment, whose number is (68) students, therefore, four halls were chosen by random assignment method from a total of 17 halls to be a group (A, E) as the experimental group and group (C, D) is the control group as shown in Table (1).

Table (1) Distribution of the research sample

Group	Total number of students	The number of excluded students	Number of students after exclusion
experimental (A, B)	34	There isn't	34
Control (C, D)	34	There isn't	34

Total	68	-	68
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**Third: Control procedures**

A- The internal integrity of the experimental design: The researcher tried to control the internal factors that may affect the results of the experiment as follows:

**Equivalence of the research sample groups:** The researcher conducted the statistical parity between the two research groups in the following variables (chronological age, intelligence, previous biological information test, academic achievement at the end of the year for the third grade of biology) and that the researcher adopted the t-test for two independent samples, and the results showed the absence of Statistically significant differences between the experimental and control group students.

**Controlling the conditions of the experiment /** is the period for which the experiment was applied (measuring tools, experimental extinction, academic content, processes related to maturity, subject teacher, class distribution, ensuring the confidentiality of research and the physical conditions).

**- External integrity of experimental design /** effect of experimental procedures, experimental selection, interaction between test and experimental variable, interaction of experimental situations.

**Fourth: Research preparing**

**1- The scientific material:** The scientific material that the researcher will study for the sample of the research has been specified in the chapters (Chapter One / Classification of Living Organisms, Chapter Two / Ecology and Ecosystem, Chapter Three / Food Chain, Chapter Five / Factors Affecting the Environment, Chapter Six / Animal Adaptation to The environment)

**2- Behavioral purposes:** The researcher formulated 150 behavioral objectives according to Bloom's classification in the cognitive domain distributed for the following levels (remembering - comprehension - application - analysis - synthesis - evaluation) and then presented to a group of referees and specialists in the field of teaching methods of life sciences and biology teachers, to state their views on the accuracy of the behavioral objectives and the extent of their coverage of the educational content and to determine the level that each paragraph measures, and in light of their opinions and observations, some simple adjustments were made.

**3- Preparing the teaching plans:** The researcher relied on the behavioral purposes and the educational material as a result of preparing the teaching plans for the first five specific chapters (classification of living organisms, ecology and ecosystem, food chain, factors affecting the environment, the adaptation of animals to the environment) for the subject of biology for the fourth scientific grade By (14) teaching plans for the experimental group that studies according to the guided imagery strategy using Google Classroom and (14) teaching plans for the control group that studies according to the traditional method using Google Classroom by asking questions by the researcher and answering them by students.

**A research tool for the test of imaginative thinking skills /** the test of imaginative thinking skills was prepared, and the test in its final form consists of (13) essay questions, distributed into eight main skills

**Investigative application to test imaginative thinking skills**

**1- The first exploratory application:** to ensure the clarity of the test paragraphs, the clarity of the instructions, the identification of the difficulties that the researcher faced during the application to avoid them, as well as the determination of the time it takes to answer the test questions. The imaginative thinking skills test was applied on Wednesday 9/12/2020 on the pilot sample consisting of (30) one of the fourth scientific students in Al-Faiha High School for Girls, and it was found that the average time for answering the test is (30) minutes and its paragraphs were clear, and so the test became ready to be applied to the sample of statistical analysis.

**The second exploratory application:** The researcher applied the test on the second exploratory sample consisting of (157) students of the fourth scientific grade at the School of Thought for the purpose of finding the psychometric characteristics of the test represented in the validity, consistency and discriminatory power of the test paragraphs and after correcting all the forms, the forms that contained random answers and the forms were excluded With no answers, and thus the number of forms for the pilot sample reached (150) questionnaires, and the sample grades are illustrated.

**Statistical analysis of the items of the test of imaginative thinking skills:**

**The discriminatory strength of the paragraphs:** Accordingly, the researcher corrected (150) test forms arranged in descending order from the highest degree to the lowest degree, then selected (27%) of the forms with the highest scores and (27%) of the forms that obtained the lowest scores, and the standard deviation was extracted the arithmetic mean of each paragraph of the two groups' paragraphs, and by using the T-test for the two independent samples to calculate the significance of the differences between the averages of the upper and lower groups for each paragraph, and it was found that all the items have an acceptable discriminatory power because all the calculated T-test values ranged between (5.551-10.354), greater than their tabular value ( 1.980) at a degree of freedom (88) with a significant level (0.05).

**Validity**

**Apparent validity:** This is decided by a group of arbitrators specialized in the field of educational and psychological sciences through the logical description of the test items and the determination of their suitability for measuring the phenomenon to be measured.

**Constructive validity:** This type of validity is achieved by finding:

**The relationship of the paragraph score to the total score of the test:** - The Pearson correlation coefficient was applied to calculate the relationship of the score of each paragraph to the total score of the test, it turns out that the values of the correlation coefficients for all the paragraphs are a statistical function, if they are greater than the tabular (0.161) at the level of significance (0.05) and the degree of freedom (148)

The correlation of field degree correlation with the total score of the test: - The correlation relationship between the degree of individuals in the same field and the total score of the test was found by correcting the sample forms of (150) forms using the Pearson correlation coefficient, and that all the correlation coefficients are a statistical function when compared to the tabular value of (0.161 ) With a degree of freedom (148) and a level of significance (0.05), as shown in Appendix (18).

**Stability:** The researcher has verified the reliability of testing the imaginative thinking skills by adopting: -

**Alpha Cronbach coefficient:** - It is one of the methods that measure homogeneity and consistency between paragraphs, as the stability coefficient reached for the fields separately, as shown in Table (2)

Table (2) reliability coefficient for the areas of testing imaginative thinking skills

**Half-segmentation method by adopting the Spearman-Brown equation:** - It was found that the stability

Fields		Alpha Cronbach value
First field	Skilled	0.72
Second field	Cognitive	0.77

coefficient of individual paragraphs (0.685), and marital paragraphs (0.694), which is a good stability coefficient, and with this the test in its final form is ready for application to the research sample, Table (3) Distribution of paragraphs between the test areas Final imaginative thinking skills.

Table (3) distribution of the paragraphs of imaginative thinking skills, in its final form

S	Field	Number of paragraphs	Paragraph numbers
First field	Skilled	7	1-2-3-4-5-6-7
Second field	Cognitive	6	8-9-10-11-12-13

**Statistical means**

- A t-test approved to calculate the discriminatory power of testing imaginative thinking skills

- Spearman-Brown correlation coefficient / adopted to calculate the reliability of imaginative thinking skills
- Pearson correlation coefficient / adopted to investigate the significance of the correlation coefficient for the items of the imaginative thinking skills test (the item score in the total score of the test, the field score by the total score for the test).
- Alpha-Cronbach coefficient: to obtain the stability of the items of the achievement test and the test of imaginative thinking skills.
- Spearman-Brown correlation coefficient: adopted to calculate reliability to test imaginative thinking skills.

**Chapter four /**

**First / Presenting results related to testing the imaginative thinking skills**

To verify the second null hypothesis, which states that: (There is no statistically significant difference at a level of significance (0.05) between the average scores of the experimental group students who study according to the guided imagery strategy using Google Classroom and the average scores of the control group students who study according to the usual method in the test Imaginative thinking skills).

The researcher presented the results in two ways as follows:

A- To verify this hypothesis, the arithmetic mean, standard deviation, and T-value were found using the T-test for two independent samples to compare the mean scores of the experimental group and the average scores of the control group in the test of imaginative thinking skills, table (4) illustrates this.

Table (4) results of the t-test for the scores of the students of the two groups of research in the test of imaginative thinking skills

Groups	Number	Arithmetic average	standard deviation	variance	Degree of freedom	T-value		Statistical function at 0.05 level
						Calculated	Tabular	
Experimental	34	45.18	3.655	13.36	66	20.76	1.98	Function
Control	34	24.68	4.45	19.8				

Table (4) shows that the arithmetic average of the grades of the students of the experimental group who studied biology according to the guided imagination strategy reached (45.18) with a standard deviation (3.655), while the arithmetic mean of the grades of the control group students who studied the subject according to the usual method reached (24.68) and a standard deviation of (4.450) , the calculated T value (20.757) is greater than the tabular value of (1.980) at the degree of freedom (66) and the level of significance (0.05), this difference is statistically significant and thus rejects the second null hypothesis and accepts the alternative, and this result indicates the superiority of students of the experimental group who are studying according to a strategy Guided imagery using Google Classroom for female students in the control group who study according to the usual way of examining imaginative thinking skills.

- To demonstrate the size of the effect (the extent of effectiveness) of the independent variable (the guided imagination strategy using Google classroom) on the dependent variable (imaginative thinking skills) the researcher used the square equation (ITA) in extracting the effect size (d) that expresses the size of the effect. Table (5) illustrates that.

Table (5) the size of the effect of the independent variable in the variable of thinking skills, abandonment

Independent variable	Dependent	d-value	The amount of the impact size
A guided imagination strategy using Google Classroom	Imaginative thinking skills	0.867	Big

And by extracting the d-value, which reflects the size of the effect of (0.867), which is an appropriate value to interpret the size of the effect and in a large amount for the guided imagery strategy variable using Google Classroom in the test of imaginative thinking skills.

**Interpretation and discussion of the outcome of the second aim: -**

The results in Table (4) showed that there is a statistically significant difference between the mean scores of the experimental and control groups in testing imaginative thinking skills in favor of the experimental group and this means that the students of the experimental group who study according to the guided imagery strategy using Google Classroom surpass the control group students who studied according to the usual method using Google Classroom, which further improves the level of imaginative thinking skills, this is in agreement with Anderson's view that mental perception or imagination contributes to the formation of virtual networks that are more detailed than those formed on the basis of verbal practice, and thus facilitate faster retrieval of the information associated with them, often individuals who are asked to use visualization or mental perception to represent information use methods that are completely different from those used by individuals who are asked to represent such information during verbal practice, all that the mental perception contributes to is increasing the details related to the conceptual network, thus facilitating the retrieval process later (Zaghoul and Zaghoul, 2014: 212).

**Conclusions:** This strategy has affected the improvement and development of imaginative thinking skills among the fourth graders of science students.

**Recommendations:** based on the results and conclusions reached, the researcher recommends the following:

- 1- Emphasizing the necessity of adopting a guided imagery strategy in teaching biology at the elementary, intermediate and preparatory levels in light of the available possibilities.
  - 2- Familiarizing male and female biology teachers with modern teaching methods and methods, especially the guided imagination strategy, through educational courses, seminars and special publications.
  - 3- Emphasis on the use of educational platforms, especially the Google Classroom platform, in secondary education.
- Proposals / In light of the research results, the following proposals are crystallized:
- 1- Conducting a study that includes employing the guided imagery strategy in developing thinking skills of all kinds and in other study subjects.
  - 2- Conducting a study that includes the effect of the guided imagination strategy on other intermediate and middle school classes, and for other school subjects.
  - 3- Conducting a similar study on male students and for various scientific subjects, and comparing them with females in the measure of impact.
  - 4- Conducting a study to compare the directed visualization strategy with other strategies.
  - 5- Conducting a study that includes the impact of Google Classroom study for middle and high school.

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