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Research Article

The effect of using the information gap strategy on the fourth scientific students' " acquisition of biological concepts"

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Abstract: The current research aims to identify the effect of using the information gap strategy in the acquisition of the fourth scientific students for biological concepts, the researcher assumed the following zero hypothesis: There is no statistically significant difference at the level (0.05) between the average scores of students of the experimental group who studied using the gap strategy Information and average score of the control group students who studied using the usual method of acquiring concepts. The research sample consisted of (60) students with (30) students in the experimental group who studied using the information gap strategy and (30) students in the control group studied in the usual way, and to achieve the goal of the research, a biometric concept acquisition test was prepared after me consisting of (36) paragraphs, The results showed that there is a statistically significant difference between the arithmetic mean in the biometric concepts acquisition test for the scores of students of the two research groups and for the benefit of the experimental group.

Keywords: Information gap strategy, acquisition of biological concepts

1. Introduction

Research problem: The research problem is represented by the negative role of students in the educational process, as the greatest weight falls on the teacher, and this has led to a weakness in the acquisition of scientific concepts in general and biological concepts in particular, and this is confirmed by the results of some experimental studies, including a study (Mansour, 2013) and a study (Al-Hasnawi, 2016) and (Al-Rubaie, 2017) study, where the results of these studies indicated that there is a weakness in the acquisition of biological concepts among students in the fourth grade of science, as well as other studies confirmed a follow-on to traditional methods that give attention to scientific knowledge and that do not result in any behavioral changes that are related to A clear indication related to thinking and solving problems such as a study (Khalaf, 2012) and a study (Abdel-Sadah, 2018). From the above, the researcher intends to experiment with the information gap strategy because (according to the researcher's knowledge) there is no study that addressed this strategy on the one hand and traditional methods on the other hand in acquiring Biological concepts.

The research problem can be formulated by answering the following question: -

What is the effect of using the information gap strategy on fourth scientific students' acquisition of biological concepts?

Importance of the research: The importance of the current research can be summed up in the following points: -

1- The current research comes in response to the scientific and educational progress in the fields of developing biology teaching in the fourth scientific grade, using the information gap strategy as one of the modern learning strategies that is consistent with contemporary trends in biology teaching.

2- The importance of teaching biological concepts for the fourth scientific grade because they are concerned with the study of the environment and what it contains, which constitute conceptual relationships, are related to natural life, the solution of its problems and the interpretation of its various phenomena, and thus its acquisition gives us an understanding of the universe in which we live what happens in it.

3- The current research may be considered a qualitative addition to the educational library, researchers and specialists can use it to develop the process of teaching biology and conducting research using an information gap strategy targeting knowledge of the impact or its effectiveness in several variables.

4- The possibility of benefiting the Ministry of Education from the results of this study in developing the teaching of revival in the fourth preparatory stage.

5- Not conducting a previous study that addressed the information gap strategy and its effect on acquiring biological concepts together in one study.

The research goal: - The effect of using the strategy (information gap) in the acquisition of scientific fourth-grade students to biological concepts.

Research hypothesis: - To verify the research objective, the following zero hypothesis has been formulated: -

There is no statistically significant difference at level (0.05) between the average scores of students of the experimental group who studied the subject of revival using the information gap strategy and the average score of the students of the control group who studied the same subject using the usual method of acquiring concepts.

Search limits: - The current search was limited to: -

1- Fourth grade students in one of the Diyala governorate secondary and government preparatory day schools of the General Directorate for Diyala Education / Baquba District Center for the academic year 2019-2020.

2- The first five chapters (classification of living organisms - ecology and ecosystem - food chain and cycle of elements in nature - environmental habitats and biomes - factors affecting the environment) from the biology course book to be taught for the fourth scientific grade, i9, 2018, Ministry of Education - The Republic of Iraq .

3- The first course of the academic year 2019-2020.

Defining terms: - First: (Impact) defined by each of: -

Ibrahim (2009) that "the ability of the worker under study to achieve a positive result, but if this result is negated and not achieved, then the worker may be one of the direct reasons for the occurrence of negative consequences" (Ibrahim, 2009: 30)

Procedural definition: -

"It is the amount of effect that the independent variable of the information gap strategy has caused as a result of using its steps in teaching the experimental research group in the dependent variable of acquiring the biological concepts by testing prepared for the purposes of the current research."

Second: (The strategy) was defined by each of: -

1- Hamadneh and Khaled (2012) as “they are systematic and sequential procedural steps that are comprehensive, flexible and considerate to the nature of learners and that represent the real reality of what is happening inside the classroom to achieve desirable educational outcomes” (Hamadneh and Khaled, 2012: 4)

2- Procedural definition: It is a series of organized steps and procedures that the researcher (the teacher) is working on planning to help students of the experimental group to acquire their biological concepts in biology through the number of the researcher (the teacher) of the teaching plans and preparing it for educational methods and activities included in the academic content to achieve goals The lesson is measured by testing the acquisition of biological concepts.

Third: (Information Gap Strategy) Defined by:

1- Ambosaidi and Hoda (2016) as "one of the active learning strategies whose idea is based on the principle of complementarity as students are divided into bilateral or quadruple groups, they cooperate with each other and each student completes what is missing from the other student of information." (Ambosaidi and Hoda, 436: 2016)

2- Procedural definition: It is a set of sequential and regular steps that the researcher follows inside the classroom in teaching students of the experimental group by dividing students into two or four groups comprising two students or four students for each group in order to achieve cooperation between students and supplement the missing information with them.

Fourth: (Acquisition): Who knew:

1- Alwan and others (2014) that "the extent of learners' understanding of what they have learned from specific experiences in a subject measured in terms of the degrees they obtain in the achievement test"

(Alwan et al., 2014: 56)

2 - Procedural definition: "The ability of the fourth scientific students ((the current research sample)) to define the concept, distinguish it and apply it, measured by the degrees obtained by students in the test of acquiring biological concepts prepared by the researcher in advance and applied at the end of the research experience"

Fifth: (concepts) were defined by each of: -

1- David (2014) as “a mental perception created by the mind when dealing with a group of events or things between them with basic properties that make them one group, called a name that indicates them all, even if they differ in secondary properties” (David, 2014: 212)

2- Procedural definition: It is a mental perception resulting from the awareness of the relationship between a group of things or events and is often expressed by a word or symbol related to a subject of biology subjects for the fourth scientific students, and students can acquire it by using the educational information gap strategy of the experimental group. Through their ability to achieve the following processes (defining the concept, distinguishing the concept and applying the concept) and then measuring it through the test items prepared by the researcher for this purpose.

2. Background theory and previous studies.

Theoretical background: - Structural theory:

There are many modern philosophies, which are the basis for the teaching methods adopted in the educational process, including structural philosophy, which emerged from many of the teaching methods that underpin several different educational models. Structural theory aims to help learners in preserving the basics of

knowledge in their memory to form a sound scientific pillar for them and understand knowledge so that they can use it to understand the surrounding phenomena and the use of knowledge in solving problems facing them in life situations and make learners the focus of the educational-learning process. (Abu Rayash, 2007: 287), as this theory focuses on the learner's role in the self-building of knowledge in the sense that knowledge is not negatively received but rather that it is constructed with active activity, a reception process that involves the reconstruction of learners to new meanings within the context of their immediate knowledge with their past experiences and the learner's environment. (Atiyah, 2015: 248)

Active learning: It is defined as "any activity that causes students to engage in doing things and think about those things that they did, and it is a multi-directional learning experience in which learning occurs by moving from the teacher to the learners, from the learners to the teacher, and from the learner to another learner" (Badawi, 2009: 149). The researcher concludes that active learning is that learning that depends on the positive and active interaction between the components of the educational process, which is the teacher and the learner and the content of the educational material, as the learner is vital, positive and self-reliant, so he learns through research and investigation, collecting information and asking questions, then discussing those questions With the members of the group and then do the activities that require thinking and meditation, and that is under the supervision of the teacher whose role is limited to guidance and guidance away from the role of indoctrination.

Information Gap Strategy: - It is one of the active learning strategies in which each student works with each other and has somewhat different information where they can give a complete picture by sharing this information with each other. (Harmer, 2007: 129), which is an activity in which couples work to obtain information and try to solve that activity, and the teacher divides students into binary or small groups so that they work to accomplish the activity that is presented to them through cooperation and discussion among them, so discussion The student to his classmates and dialogue with oneself helps the student to build different meanings of the visions that emerge from them, thereby making the learning process a meaningful process (Ambossaidi and Hoda, 2016: 436). In this strategy, the members of one group are obligated to provide help and positive interaction face to face with his colleagues, and each student encourages and develops positive interactions and communication with learners. (Muhammad and Tariq, 2008: 34 - 35). The cooperation of students motivates them to work hard and persevere in order to ensure the similarity of their colleagues and the desire to assert themselves and that they are effective like others, and also develops a curiosity and works to encourage students who are slow learners to engage with their colleagues to participate in Various educational activities (Faraj, 2013: 29), as cooperative learning provides a wonderful opportunity to develop flexibility in students 'thinking, as his colleague or colleagues open up different fields of thinking when they present their ideas in different fields, and so the areas of thinking of students vary. (Embossaidi and Suleiman, 2015 : 118-119)

Strategic steps of the information gap: -

The steps for this strategy are outlined in the following:

1- Divide the students into two or four groups.

2- The teacher presents an activity that is carried out with two complementary steps.

3 - Each student deals with his own activity and works to achieve it. For the quadruple groups, each two students share their own activity.

4- After completing the activity, the group members participate in the discussion about the results, and each student in the group trains his colleague.

5- The results are presented orally orally to students (Al-Shammari, 2011: 55).

Acquisition of biological concepts: - The process of acquiring concepts is one of the goals of teaching science at all different stages of education and it is one of the basics of science and scientific knowledge, which is useful in its role in understanding its general structure and in the transmission of the impact of learning, for this the process of forming scientific concepts or refining them with students at different levels of education It requires an appropriate method of teaching that ensures the proper formation of concepts in science learning and education. (Olives, 2004: 80)

Biological concepts: - Biological concepts are mental perceptions that give symbols, pronunciation or names for a specific idea that is reached through distinction and classification processes for the common characteristics of biomes (Aga, 2007: 57), and biological concepts are among the most important aspects of learning science because of its importance In organizing experiences, remembering knowledge, following up on perceptions, linking them to their sources, and facilitating access to them, where educators emphasize that clarity of concepts and terminology is necessary for understanding, understanding, and achieving scientific understanding and communication, as they gain scientific knowledge of its flexibility and allow it to organize, and it occupies the second level in the knowledge hierarchy. (Al-Shobaki, 2010: 50)

previous studies :-

Studies on the independent variable (information gap strategy)

1. Study (Al-Zaidi, 2018): This study was conducted in Iraq, and aimed to know "the impact of the information gap strategy on the collection of history material for fifth-grader literary students", and the current research community was represented by a government primary school in Diyala Governorate, the total of the study sample (61) female students were divided into two groups that are not equal in number, the number of female students of the experimental group reached (31) students who studied according to the steps of the information gap strategy, while the number of female students of the control group reached (30) students who studied according to the usual method, the experimental design with two groups was adopted Experimental and control, the research tool consisted of preparing a multiple-choice achievement test in addition to essay questions, either the statistical means were represented by the T-test and Kay square, the difficulty and strength differentiation coefficients and the effectiveness of the camouflaged alternatives and the Pearson correlation coefficient and the Siperman-Brown equation, and has indicated results The study indicates that there is a statistically significant difference between the two research groups in achievement and in favor of the experimental group.

2. Study (Al-Safi, 2016): This study was conducted in Iraq and aimed to know "the impact of the information gap strategy on the achievement of fifth-grade primary students and their motivation towards science" and represented the research community at one of the government primary schools in Wasit Governorate, and the total of the study sample (51) A female student divided into two groups, the experimental reached (26) female students, who studied using the information gap strategy, and the control reached (25) female students who studied according to the usual method. The experimental design with partial control represented by the post-achievement achievement and motivation was approved. The research tool was the achievement test and measuring The motivation of learning, while the statistical means were the T-test of two independent samples, the Vakronbach equation, the Pearson correlation coefficient, the Spearman-Brown equation, the Koder Richardson equation 20, and the Cooper's equation, the research results indicating that there is a statistically significant difference between the experimental and control groups in the achievement and motivation variables in favor of The experimental group and the information gap strategy have a large and positive impact on increasing achievement and the motivation for learning for fifth grade primary students Y.

Studies dealing with the dependent variable (acquisition of biological concepts)

1. Study (Al-Hasnawi, 2016): This study was conducted in Iraq, aimed at knowing "the effect of using a learning strategy centered on the problem in acquiring biological concepts and developing creative thinking among students in the fourth scientific grade", the experimental design was partially adjusted for two independent samples equivalent, The current research community was represented by the fourth-grade students in one of the government day schools in Babil Governorate, the sample of the research was the fourth-grade students in the preparatory revolution for girls, which numbered (74) students, the number of members of the experimental group reached (36) students, which were studied according to the steps of the learning strategy Centered around the problem, while the number of members of the control group reached 38 students, which were studied according to the usual method, the research tool was to prepare two tools, the first tool was to build a test to acquire biological concepts and the second tool was the creative thinking test, the statistical methods were represented by the Spearman-Brown equation and the Kuder equation - Richard Sun-20 and the t-test of two independent samples unequal in number, and the results of the study indicated the superiority of female students. For the experimental group who studied according to the steps of the learning strategy centered around the problem on the students of the control group who studied according to the usual way and with both variables.

2. Study (Mansour, 2013): This study was conducted in Iraq, aimed at knowing "the effectiveness of multimedia in acquiring biological concepts and environmental awareness among students of the fourth grade in scientific biology", the current research community is represented by students of one of the government day preparatory schools in Najaf Governorate Center, and the sample of the fourth-grade students was in the Safar preparatory school for girls, as the study sample reached (64) students distributed equally between the two research groups. The number of the individuals of the experimental research sample reached (32) students, which were studied using multimedia and their number in the number for the group Control, which was studied according to the usual method, two research tools were prepared, the first tool was a test of acquiring biological concepts, while the second tool was represented by the measure of environmental awareness, the statistical methods were represented by the t-test of two independent samples equal in number and the equation of Koder Richard Sun - 20, the results of the study showed the superiority of female students The experimental group, which was studied using multimedia, on the students of the control group who studied using the usual method in the ACTS test Provide biological concepts and an environmental awareness scale.

Discussion of previous studies: - All previous studies followed the experimental approach, as well as the current study. (Al-Zaidi: 2018) and (Al-Safi: 2016) study aimed to know the effect of the information gap strategy on achievement, while the current study aimed to know the effect of the information gap strategy on acquiring biological concepts. (Al-Safi: 2016) study was applied to the primary stage. As for the remaining studies, it was applied to the preparatory stage. As for the current study, it was applied to the preparatory stage. (Al-Zaidi: 2018) study dealt with history and study (Al-Safi: 2016) conversation subject, our current study is consistent with (Al-Hasnawi: 2016) study and (Mansour: 2013) and it was in biology for the fourth scientific grade. Previous studies varied in terms of tool The research used, each according to its objectives. As for the current study, the researcher used the test of acquiring biological concepts

The size of the sample in the study (Al-Zaidi: 2018) was (61) female students, and in the study (Al-Safi: 2016) (51) female students, and the study (Al-Hasnawi: 2016) (74) female students, and this means all studies were appointed by the female. As for the current study, the number of individuals in the study sample reached (60) male students. Previous studies differed in statistical means to address its results, which was caused by different study goals, hypotheses, and experimental design. As for the current study, the researcher will use the appropriate statistical methods in his research, which he will mention in the third semester.

Extent of benefit from previous studies: which includes the following:

1. Identify the sources that dealt with the independent variable represented by the information gap strategy.
2. The current search test numbers.
3. Take advantage of the statistical methods used in the previous studies appropriate to analyze the results under discussion.
4. Choose the experimental design.

2. Research methodology and procedures

Research methodology: The researcher adopted the experimental approach to achieve the goals of his research, and the reason for this is that it is considered an intentional and controlled change of an event with what must be observed from the changes in the same event and their interpretation.

Experimental design:

Choosing the appropriate experimental design for the study is important because it ensures accuracy in answering the study hypotheses and it is the concept that guides to the experimental foundations that define the features of the experiment (Raouf, 2001: 179) and since the current research includes one independent variable (the information gap strategy) And a dependent variable (the acquisition of biological concepts), so experimental design with partial tuning for the two experimental (control, control) groups with the post test was chosen as shown in chart (1).

Scheme (1) experimental design for the individuals in the research sample

Dependent variable	Independent variable	The group
Acquisition of biological concepts	Teaching according to the information gap strategy	Experimental
	Teaching according to the usual way	Control

Research community: It is represented by all the fourth scientific students who are studying in government day preparatory and secondary schools for boys that are affiliated to the General Directorate of Education in Diyala Governorate, Baqubah District Center for the academic year (2019-2020).

Research sample: Al-Jubouri defined it (2013) as "a partial group of the original community for research, selected in an organized scientific way from all elements of the community vocabulary and in a certain percentage according to the nature of the research and the size of the original community, so that it carries the same characteristics or common characteristics and works to achieve the goals of the research (Al-Jabouri The researcher chose randomly the sample of the research represented by the Al-Sharif Al-Radhi prep from among the schools of the current research community, and it included three divisions (A, B, and C). The exclusion and its aftermath is shown in Table (1).

Table (1) Distribution of students of the research sample to the experimental and control groups

Equivalence of the two groups: The equivalence process was performed in the variables (previous collection, previous information test, intelligence test, age in months) and they were all equal and as shown in tables (2-3-4-5) below: Table (2)

Statistical significance of the experimental and control groups of the previous achievement variable

Number of students after exclusion	Number of students excluded	Number of students before exclusion	Division	The group
30	2	32	a	Experimental
30	non	30	b	Control
60	2	62		Total

Significance level (0.05)	**(t-test) value**		**Degree of Free**	**variance**	**SMA**	**No. of sample**	the group
Not sign (0.05)	**table**	**calculate**	58	191.89	68.9	30	Experimental
	1.26	2.00		160.4	73.2	30	control

Table (3)

Statistical significance of the experimental and control groups of the information test variable

Significance level (0.05)	**(t-test) value**		**Degree of Free**	**variance**	**SMA**	**No. of sample**	the group
Not sign (0.05)	**table**	**calculate**	58	3.2	8.03	30	Experimental
	1.2	2.00		3.11	7.5	30	control

Table (4)

Statistical significance of the experimental and control groups of the intelligence variable

Significance level (0.05)	**(t-test) value**		**Degree of Free**	**variance**	**SMA**	**No. of sample**	the group
Not sign (0.05)	**table**	**calculate**	58	48.31	28.13	30	Experimental
	0.591	2.00		34	27.2	30	control

Table (5)

Statistical significance of the experimental and control groups for the age variable, calculated in months

Significance level (0.05)	**(t-test) value**	**Degree of Free**	**variance**	**SMA**	**No. of sample**	the group

Not sign (0.05)	**table**	**calculate**	58	30.24	183.53	30	Experimental
	0.214	2.00		29.31	183.23	30	control

External safety of experimental design: It means the set of characteristics related to the experimental situation, which is the researcher's ability to generalize the results of his research that have been reached to positions and samples similar to the study sample. (Mahmoud, 2007: 145) The researcher tried to limit the influence of exotic variables that could affectOn the safety of the experiment, as well as the conduct of parity in some of the variables for the research sample by controlling those variables, which are as follows:

1 - Selecting the sample members: The researcher has tried to control this factor through random selection of the sample and conducting statistical equivalence operations for students of the two research groups.

2- Experimental extinction: It means the effect generated by leaving a number of students (the study sample) or their interruption during the trial period, which results in an impact on the results of the study (Al-Zobaie and others, 1981: 43), and during the conduct of the experiment there was no interruption or Transferring or leaving any student from the two research groups except in some cases of absence in almost equal proportions to the two research groups.

3 - Operations related to maturity: It means the occurrence of biological, psychological or mental changes on the same individual who is subject to experience during the period of the experiment, such as fatigue and growth, so that it positively or negatively affects the results of the research, which does not give way to attribute the research results to the experience only (Melhem, 2010 : 424). And there was no effect of the maturity factor on the course of the experiment, since the experiment period was uniform for the two research groups. Among students.

4 - Experimental procedures: In order to verify the external safety of the experimental design and thus the possibility of generalizing the results of the current study, the factors must be identified and controlled, including: -

a. Confidentiality of the experiment: - The researcher has been careful to ensure the confidentiality of the experiment by agreeing with the school administration not to tell the students the nature and purpose of the research.

B. Duration of the experiment: The trial duration was equal for the two experimental and control groups, which were (14) weeks and (36) study plans, and the holidays and emergency conditions were compensated.

C. Study material: - The academic subject for the current research content is defined in the first five chapters of the book revival material for the fourth grade scientific author by the Iraqi Ministry of Education / ninth edition / for the year 2018 AD

D- Distribution of shares: - The number of shares was three every week.

E - Physical conditions: - They are the external characteristics and influences of the place in which the research experiment is conducted from lighting, ventilation and noise, which may affect the behavioral patterns or variables related to the research in the study (Abdel Rahman and Adnan, 2008: 221), and two adjacent classrooms have the same Specifications, according to the teaching method.

And - teaching: - It is a set of procedures and processes that the teacher performs with his students to accomplish certain tasks in order to achieve specific goals (Ali, 2011: 75). The researcher has personally studied the students of the two experimental (experimental) and (control) groups.

Search requirements:

1 - Defining the content (defining the scientific subject): - The researcher has determined the content of the scientific subject that he will teach during the period of the experiment according to the first five semesters of the biology textbook, which is to be taught to fourth-grade students during the first semester of the academic year (2019-2020)) It is the first chapter (classification of living organisms), the second chapter (ecology and ecosystem), the third chapter (the food chain and the cycle of elements in nature), the fourth chapter (environmental habitats and biological habitats), chapter five (factors affecting the environment).

2 - Behavioral purposes of teaching plans: - Behavioral purpose is the amount of desired and expected change in the behavior of the learner, which can be measured after the learner has passed one or two lessons. (Chalabi, 2005: 39) After analyzing the subject, (115) behavioral purposes were formulated in The light of Bloom's taxonomy for the cognitive domain and the six levels (remembering, assimilation, application, analysis, composition, evaluation) has been presented to a group of experts and arbitrators with expertise.

3 - Daily study plans: - Planning is an organized preparatory process aimed at drawing the method or method of work that leads to achieving the desired goals effectively and efficiently, taking into account the different elements of the educational situation of a teacher and learner and the capabilities and educational materials. (Al Ani, 1978: 89)

4- Defining the biological concepts: - By analyzing the content of the academic subject and identifying the main regular concepts in it that have reached (12) major concepts and (44) secondary concepts.

The research tool: Preparing the biological concepts acquisition test: -

Optional paragraphs have been prepared to measure the extent to which students of both experimental and controlling research groups acquire regular concepts in the subject matter and it has been taken into account that each of the major concepts that have been identified is measured through three test items which are (definition of concept, concept recognition, application of concept). (Darwazeh, 1995: 14).An objective test of the multiple choice type. For each test paragraph, four alternatives were specified. One of these alternatives represents the correct answer, while the other three are wrong. The multiple choice test was chosen because of the characteristics of this type of test. Among the advantages of it covers a large part of the content of the course subject matter within the research plan, easy to correct and high sincerity and persistence in it and measures various capabilities of students. (Al-Adwan and Al-Hawamdeh, 2011: 203).

1- Determine the number of concepts in each of the five chapters of the textbook for the fourth scientific grade.

2- Calculating the percentage of concepts for each chapter separately.

3- Determining the number of paragraphs of the biological concepts acquisition test.

4- In light of the percentage of concepts in each chapter, the paragraphs for the acquisition of biological concepts are distributed. As shown in the following table:

Table (6)

The number of concepts, their percentage, and the number of test items for each semester subject to the research experiment

No. of items	**ratio**	**No.**	Threads	seasons
9	30. 4	17	Classification of living things	Chapter one
9	23.2	13	Ecology and ecosystem	Chapter II
12	19.6	11	The food chain and the cycle of elements in nature	Chapter III
3	5.4	3	Environmental habitats and biomes	the fourth chapter
3	21.4	12	Factors affecting the environment	Chapter V
36	100%	56	5	Total

Thus, the test was corrupted from (36) objective paragraphs of the multiple choice type.

1. Instructions for correcting test passages: - A score of (0,1), (0) was given for the wrong or abandoned answer and (1) for the correct answer, and thus the final test score ranged between (0-36) degrees.

2. The validity of the test: - Through the presentation of the test to the Committee of Arbitrators and Experts in the field of biology teaching methods, measurement and evaluation, and the number of valid paragraphs in the measurement of biological concepts, it got 84% in light of Cooper's equation, where the test paragraph is true if it obtained approval 80% or more of experts and specialists (Bloom: 1981,73))

3. Applying the test to two survey samples from another school for the purpose of verifying the clarity of the test paragraphs and instructions and the time taken to answer it and diagnosing the level of difficulty of the paragraphs and its discriminatory strength, the average time (40) minutes and the difficulty factor ranged between (0.26 -0.39) and the strength of its distinguishing ranged from (0.52 -0.78 Thus, the test is appropriate and valid, and then the stability coefficient of the test items was calculated using the method of internal homogeneity and applying the Koder Richardson-20 equation to (0.81).

Application of the experiment: - After preparing the requirements for the physical experiment and setting some variables that can be available in the experiment, the researcher began teaching to students of the experimental and control groups, on (6/10/2019) in the light of the following procedures: -

1- Applying the teaching plans of the experimental group according to the information gap strategy in biology for the fourth year of middle school.

2- Applying the teaching plans of the control group according to the usual method used in teaching neighborhoods for the fourth year of middle school.

The experiment ended on (20/1/2020), as the biological concepts acquisition test was applied to the experimental and control research groups on (10/22/2020) and at the same time, in cooperation with the school administration, everyone finished answering within the time specified for the test.

Statistical means: - The researcher has adopted statistically treating research data by the following statistical means:

1- T-test for two independent samples.

2- The coefficient of difficulty to calculate the difficulty of each of the test items.

3- The Discrimination Power Factor to calculate the discrimination strength of each paragraph.

4- The Richardson Coder-20 equation to calculate the test stability coefficient.

5- Cooper equation for arbitrators agreement.

6- The formula for the effectiveness of the wrong alternatives to the test items.

7- The effect size equation to calculate the effect size of the variable independent in the dependent (Allam: 2009) (Al-Mashhadani and Imad: 2009)

3. Research findings and recommendations

Presentation of results: the results of the post-concept acquisition test: for a purpose

To verify the research goal through the null hypothesis, the arithmetic mean and the variance for the degrees of both the experimental group and the control group were found in the test and by using the T-test for two independent samples, the T-value was found as in Table (7).

Table (7)

Statistical significance between the average scores of students of the experimental and control groups in the biological concepts acquisition test

Significance level (0.05)	**(t-test) value**		**Degree of Free**	**variance**	**SMA**	**No. of sample**	the group
	table	**calculate**					
sign in (0.05)	8.3	2.00	58	12.51	26.4	30	Experimental
				7.44	19.6	30	control

It is clear from the above table that the calculated T value of (8.3) is greater than the tabular T value of (2.00) at the level of significance (0.05) and with a degree of freedom (58). Accordingly, the null hypothesis which states that (There is no statistically significant difference at the level of significance is rejected 0.05)) between the average scores of the experimental group students who studied using the information gap strategy and the mean of the scores of the control group who studied using the usual method of testing the acquisition of concepts) and accepting the alternative zero hypothesis, that is (there is a statistically significant difference between the experimental and control groups in the concept acquisition test Biology and in favor of the experimental group) This means the superiority of the experimental group students who studied according to the strategic steps of the information gap, over the control group students who studied according to the usual method.

The magnitude of the impact for the biome concept acquisition test was (0.542), which is a significant value compared to the impact criterion as shown in Table (8). Standard size and impact estimate

0.01	0.06	0.14	Impact size value
Weak	Average	Large	Appreciation

(Al Yaqoubi, 2010: 84)

That is, the effect of the independent variable was significant in the dependent variable.

Interpretation of the results: - The results of the current study presented in Table (7) related to the null hypothesis showed the impact of the information gap strategy, which led to the superiority of the experimental group students over the control group students in the acquisition of biological concepts. This indicates the positive impact that this strategy has had on students' acquisition of biological concepts. This is due to the fact that the

information gap strategy is one of the unfamiliar strategies among students, which made them more participatory and positive compared to the usual way. This strategy also helped keep information on students 'minds for a longer period because he discusses this information with his colleagues and thus understands its meaning and not only deaf memorizing it, as well as intense attention and focus during the lesson and thus eliminates monotony and boredom in addition to the spirit of cooperation between students embodied in this strategy.

4. Conclusions

In light of the research results, the following was reached:

1- The use of the information gap strategy has a significant and positive impact in testing the acquisition of biological concepts.

2- Increase students 'effectiveness in participating in the lesson and draw their attention to it.

3- The possibility of using the information gap strategy in the preparatory stage.

Recommendations: In light of the research results, the following was reached:

1- The necessity of using the information gap strategy to teach the subject of revival in the other preparatory stages.

2- Using the information gap strategy in teaching biology for fourth-grade middle school students, as it has a positive effect on acquisition

Biological concepts and attempt to include them as a model for teaching material.

Suggestions: In light of the research results, the researcher suggests the following:

1- Conducting a study similar to the current study on the effect of using the information gap strategy in biology at different levels of study for both sexes.

2- Conducting other studies similar to the current study on the effect of the information gap strategy on teaching and other variables.

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