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"The Effect of a wall building strategy on The Achievement of Fifth grade primary schoolgirls in Science"

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Methods of Teaching science

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ABSTRACT

Aim the present research to know of(the effect of a wall-building strategy on the achievement of fifth-grade female pupils Primary in science)and to achieve the goal of the research ,the researcher female putted the zero hypothesis ,which states :No there is a statistically significant difference at the significance level(0.05)betoween the mean scores the schoolgirls in the group experimental who study science subject according to the strategy of building a wall ,and the average scores for schoolgirls the control group who studies the science material in the usual way in the achievement test for the purpose of verifying the validity of the null hypothesis ,the researcher female applied the experiment electronically in Al-Adenaniya school ,the research sample was chosen the second half of the academic year(2019-2020) Represented by fifth –grade primary school girls ,randomly distributed into two groups(the experimental, control) ,the number of schoolgirls in the experimental group reached (28)is a schoolgirl and the number of schoolgirls in the control group reached (30)is a schoolgirl ,and the two group (the experimental, control) were rewarded in the following variables :(time age calculated by months ,IQ test scores ,half-year scores for science) and according to the behavioral goals and the relative importance of the content ,the researcher female prepared an achievement test consisting of (40)paragraphs of a multiple choice type and female was aware of psychological characteristics, and it continued to apply the experiment for a moth and eight days ,after which the achievement test was applied at the end of the experiment to the two groups at one time and the results that showed the superiority of the experimental group that was taught were analyzed according to the strategy of building a wall on the control group that was taught according to the usual method in the achievement variable.

Introduction:

If education is a preparation for life, It must prepare pupils for life in a world in which science and its application have key role. Of through help pupils understanding of aspects of the natural environment ; a capacity to reason from evidence ; an understanding of the nature of science and of how scientific knowledge is developed ; and the key ideas that will help them make sensible decisions about how they live their lives and which affect the lives of others.(Harlen & Qualter ,2013:2) In addition to that, Teaching pupils the concepts of science ,conducting investigations and making generalizations helps to enhance their abilities in thinking and reasoning , as higher thinking processes (analysis, synthesis, critical evaluation and drawing inferences)are improved with pupils performing investigations in science(Davar,2012: 2) the national curriculum document(1999) illustrated the importance of science in its introduction, which stipulated : "Science stimulates and excites pupils curiosity about phenomena and events in the world around them it also satisfies this curiosity with knowledge .because science links direct practical experience with ideas .scientific method is about developing and evaluating explanations through experimental evidence and modeling this is a spur to critical and creative thought through science ,pupils understand how major scientific ideas contribute to technological change- impacting on industry ,business and medicine and improving quality of life .pupils recognize the cultural significance of science and trace its worldwide development" (Gillard,2005:2) and thus, the teaching of science in schools must evolve in a way that aims to rid of the mistakes of the traditional verbal study ,so that the study topics become more relevant to the life of the pupil, and that it depends on practical experience and aims to modify the style of thinking and behavior in line with the sound working life(sbeitan,2010: 3)It is considered, active learning is an opportunity for pupils to engage in the learning process .it connects learners to the content through movement, reflection or discussion ,making pupils the center of the learning process as they take the initiative to learn .Also, Active learning engages and motivates pupils on the development of pupils skills rather than just transmitting information while enhancing understanding and performance (Casale-Giannola &Green, 2012: 6)The learning process should always contain two aspects :exposure to new information and understanding of what that information means .However, A third aspect needs to be added; consideration of pupils attitudes and perceptions about schooling and subject matter .so teacher are needs to find ways and strategies effectiveness promote pupil success and increase their academic achievement ,and active teaching strategies from are considered strategies that contribute to achieving goals ,attracting and maintaining pupil attention ,monitoring pupil progress ,and providing immediate feedback(Moore&Moore,2004:6 -16) ,Through of above , It was found that of the methods that may contribute to the understanding of the widest sciences subject and achieving many of objectives of taught in primary school , is the use of strategies for Active learning including (Wall Building Strategy) because it is of strategies modern that may help overcome issues that hinder the understanding of the schoolgirls to sciences subject and raise of the level of achievement as well as ,on the strategy was not placed in the subject of experience in teaching subject

sciences phase primary school so conducted this study to see what it was there a difference between female pupils experiment taught according to a wall building strategy and female pupils of the control group taught in accordance with the way the normal.

The Background theory and previous studies :

The strategy of building the wall dates back to constructivist theory .constructivism ,the term that jean piaget (1973)coined to describe his theory of how people learn ,refers to the process of change or knowledge construction. Traditionally knowledge has been treated as a collection of facts and information .piaget demonstrated that knowing something involves much more than being able to recite memorized information .knowing involves organizing information and forming a conceptual foundation within which new knowledge can fit. knowledge is never static the constructivist view of science teaching views learning as an active ;it changes and transforms with each new discovery .furthermore ,the learner has an active part in the knowing(Waite-Stupiansky,1997:2) process during which the learner develops or constructs their own understanding .the learner selects and integrates new experiences into already held ideas ,facts and experiences.(Gillard, 2005:3) where new concepts are built on the basis of previous knowledge(Monk& Silman ,2011:17)the constructivist teaching approach involves an orientation stage in which the pupils interest and attention is gained, the learning is given a purpose and the situation is given a context. This is followed by the elicitation stage ,in which pupils ideas are explored .the next stage is the restructuring stage, in which the pupils are presented with a wide range of strategies with which to try out new ideas. And after apply these new ideas in different contexts. the constructivist teaching is a chance to consolidate their learning and to think about how their ideas and explanations have changed.(Gillard, 2005:3) encourages the strategy of building a wall which from the active learning strategies on the development creative thinking and decision making skills and aims to train pupils to work with others and provide feedback to them ,in this strategy, are used the images, drawings ,and ideas that pupils by themselves provide (Ambo Saeedi & Huda, 2016: 122) A wall building strategy helps pupils gain a deeper understanding of science vocabulary new and concepts by guiding them to use the vocabulary in a meaningful way (Dugan,2010:15- 49)

Steps to implement a wall building strategy

- 1-The teacher divides pupils into binary, tripe ,or quadruple groups ,as he deems appropriate.
- 2-give each group cards (it can be coloring)contains on miscellaneous ideas that may be sentences ,pictures or drawings related to the main question ,or the pupils can write these ideas themselves.
- 3-Each group is given the question which will be generate ideas on him ,as well as the wall model shown in the figure(1-1) below. In the event that students are not supply by the form ,the teacher can ask them to draw it in the paper (wall paper or A3)given to them.

4-pupils read what is written in the cards and then decide which one is most related to the main question and which one is not related to it. In the event pupils decided it is related and more important placed in the bottom line of the wall and the least closely related is placed in the upper line of the wall.

5-progress feedback to pupils on their work ,with necessary each group justifying what they have done.

(Ambo Saeedi & Huda, 2016: 123)



A figure(1-1)showing how to build a wall according to important and most related in the question

There are no previous studies on a wall building strategy

The research methodology and its procedures:

It includes all the measures that were taken to achieve the goals of the research starting from the research methodology and experimental design ,defining the research community and its sample , the equivalence of the two groups experimental and control ,preparing research requirement and display the statistical means used, and that will be displayed as follows:

The experimental design of the research: includes the independent variable (information gap strategy) and (normal method) and the dependent variable (collection)therefore, the female researcher used experimental design with partial

control of two equal groups, one experimental and the other control.

The research community and its sample :

The current research community represents all fifth-grade schoolgirls in primary schools governmental belongs to the directorate general of education in the province of Babylon (center)for academic year(2019-2020Ab)who the number of divisions in the fifth primary class is no less than two divisions, As for the research sample ,the female researcher (Al-Adnania Primary School for Girls)in the Babylon Governorate Center randomly chose to conduct her research and found that it includes three sections for the fifth grade of primary(A,B&C)the female researcher chose to section(B)by the random clouds method (the lottery method)to represent the experimental group and the number of its female pupils (28)schoolgirls which will study her schoolgirls according to (wall building strategy)and the same way ,the female researcher chose section (C) to represent the control group and the number of her schoolgirls (30) female pupils which will study her schoolgirls are according to (the usual way)

The equivalent of the two research groups :

The female researcher performed a statistical equivalence between the experimental and control groups in some variables that affect the results of the experiment ,Although the female researcher chose the two groups in a random clouds method ,and although the female pupils of the research sample are from a social and economic center .they are very similar and are studying in one school , but the female researcher was keen on conducting parity between the following variables: the time age calculated by months ,first semester grades ,and the IQ test) as the female researcher performed a parity between the two groups of research in the above variables and showed the results according to the following table

variable	the group	Sample size	SMA	variance	Degree of freedom	T value		Level of significance
						Calculated	Tabulated	
Age calculated in months	Experimental	28	129.46	11.15	56	0.707	2	Not functional
	Control	30	128.83	11.86				
First semester grades	Experimental	28	64.67	264.14		0.196		
	Control	30	63.87	219.49				
IQ test	Experimental	28	20.82	33.33		0.399		
	Control	30	21.43	34.18				

Control the Variables Extraneous :

Although the female researcher has verified the equivalence of the two sets of research in some variables that are believed to affect the course of the experiment, she tried to avoid the effect of some extraneous variables in the course of the experiment. Some of these variables and how to control them are as follows: (Accidents associated with the experience: the experience was not exposed in the search to any emergency or accident impedes its progress, Experimental Exhaustion: There was no interruption or transfer of any schoolgirl throughout the experiment, Sample Selection: The two groups were randomly selected and the groups were evaluated, Maturity factor: Due to the fact that the duration of the experiment is uniform between two groups research as well as the age of the schoolgirls in the two groups so what happens from mental development will return to the members of the two groups at the same level, so this factor has not affected the search, Effect of experimental procedures: The female researcher worked to limit from the effect of experimental procedures that can affect the dependent variable during the course of the experiment).

Preparation of Research Requirements:

The research requirements are among the basic things that the research depends on and according to which the research procedures are implemented and are represented this requirements : The scientific material (content): The scientific material that the female researcher is studying has been determined for the schoolgirls of the two research groups during the period of the experiment(the second semester)of the year (2019-2020)AD was determined through which the female researcher prepared (32plans)for the experimental group that is taught according to (wall building strategy)and (32plan) of the control group that is taught according to (the usual method)

The research tool

Steps have been preparation for the research tool (achievement test), represented by the following:

Determining the purpose of the achievement test: The intended goal of preparing an achievement test is to measure the achievement of fifth-grade primary school female pupils in the science subject represented in the (friction, electrical and magnetic, seas and oceans and renewable energy, earth origin and processes geological).

Determination of behavioral goals : after the purpose of the achievement test was determined ,behavioral objectives are determined to know the extent of their achievement .and formulated the female researcher a number of behavioral goals .

Determining the test paragraphs :the female researcher determined the number of paragraphs that make up the achievement test ,as the number paragraphs of test reached (40)paragraphs

Directed by paragraphs of the test : the achievement test paragraphs were formulated in their preliminary from in light of what include in the test map (specifications table),and the female of researcher chose the type of test (multiple

choice) which is one of the best objective tests, the test consists of (40) a paragraph , distributed on the levels Bloom cognitive (knowledge, understanding, application, analysis) and on topics(friction, electrical and magnetic ,seas and oceans ,renewable energy ,earth origin and geological processes).

The test instruction: instructions and directions for how to answer were(choosing one correct alternative for the paragraph , answering all paragraphs ,time period for the answer ,writing the triple name , class and division in the space provided)

Correcting the test answers :After it has formulate paragraphs of the test and select the type of the test, has been set standard for correct answer ,the put (one score for each paragraph correct) and (zero to answer mistaken ,and paragraph abandoned whose did not answer the schoolgirl on her ,paragraph who put to her more than selection)thus top final class supreme achievement test is (40)and the lowest degree(zero) .

The validity of the test : the apparent sincerity of the virtual test was confirmed and the sincerity of content ,as shown results that honesty virtual got the proportion of agreement(88%) by the arbitrators and the specialists. As for the sincerity of the content ,the results showed that all passages of the achievement test are statistically significant ,so the achievement test is honest in measuring the extent of understanding and absorption of female pupils fifth grade in substance of science.

The exploration application for the achievement testing: and include what comes:

- The first survey application: In the first phase of the survey, the achievement test was applied to a group of female pupils the fifth grade primary of the non-research sample. The number of female pupils was 30 female pupil. The purpose of this test was to know the clarity of the test instructions and guides test and the extent of understanding and clarity of the test paragraphs for female pupils, and calculate the length of time required for the test ,as the female researcher recorded time of exit for each schoolgirl. In calculating the arithmetic mean of time, it was found that the time required to answer all the test paragraphs was (38) minutes.
- The second survey application: The test was applied to a sample of (100) female pupils in the fifth grade primary of the non-research sample. The purpose of this test is to analyze the achievement test statistically paragraphs. represented by the difficulty of the paragraphs ,paragraph discrimination, and the effectiveness of wrong alternatives.

Statistical analysis of the achievement test paragraphs :the test of achievement paragraphs were analyzed as follows:

- **The difficulty of the paragraph:** By performing The statistical analysis of the achievement test paragraphs, it was found that the coefficient of the difficulty of the paragraphs ranged from (0.36 - 0.64)therefore, all the paragraphs of the achievement test are good and their difficulty is appropriate.
- **The Discrimination of the paragraph:** the distinguishing features of the test paragraphs are the distinguishing feature that means the ability of the paragraphs to determine the individual difference between female pupils ,the test paragraphs are valid if the coefficient of discrimination between the paragraphs is 0.2 and above and the value of the coefficient of discrimination for the achievement test

paragraphs ranges between (0.33-0.63)and therefor the achievement test paragraphs are considered a good and appropriate discrimination coefficient

- **The effectiveness of the wrong alternatives:** The female researcher conducted a statistical analysis (highest 27% and lowest 27%) degree to find the effectiveness of the wrong alternatives ranging from ($-0.06 - -0.32$)and it turned out that the alternatives of the test paragraphs are all effective and therefore all are appropriate.

Reliability of the test: coefficient stability of the test depend on the relationship between each paragraph and other or between paragraphs of the test all of them, evident that from through the stability of test degrees and consistency of test paragraphs ,and can be calculated stability coefficient the test ,using the relationship of legal between units the test ,and from test specifications good is being a stable and honest even be paragraphs of the test meaningful clear must be honest and fixed at once ,so the stability indicates match the degrees of the test when you return it again, which he shows balance and stability of degrees of female pupils in the test

❖ **The Ways of finding the stability Test:**

- **The Method of dividing halfway :** this is the way of the most of ways widely used, due to avoid defects some other methods and for getting two equal images of the test the female scholar did by dividing the paragraphs of the test to paragraphs of individual and pair. and choose answers female pupils of the sample survey amounting (100) an answer ,and extract correlation coefficient Pearson between the degrees of paragraphs individual and pair been get the coefficient of persistence estimated as (0.72), whereas coefficient stability of the test midterm does not measures the total homogeneity for testing (because it Stability half only) , so have been a correction using the coefficient Spearman Brown, as it was (0.84), a coefficient fastness good of the point of view specialists.
- **The Kuder-Richardson Method 20 :** the application of equation Kuder - Richardson 20 in accordance with degrees students. Found researcher that the value of the stability of the test is (0.81) so that is good value and appropriate so is the test constant.

Application of the research tool: The experimental and control groups were informed of the date of application of the test, one week before it was carried out, and it was applied after the completion of teaching the specific material for the two research groups at one time. The female researcher supervised the application of the test.

The Statistical methods: The female researcher used the t-test equation for two independent samples to make the parity between the experimental and control groups and spearman-brown equation. The female researcher used the equation to correct the correlation coefficient between the test segments (individual and marital scores) after the Pearson correlation coefficient, The spss program, the Microsoft Excel 2007 program (Excel)

Results: The results show that the experimental group is superior to the control group

The statistical The group	No	SMA	standard deviation	Difference	Freedom degree	T value		Level of significance
						Accounted	schedule	
Experimental	28	28.29	3.84	28.73	56	3.254	2.00	statistically significant
Control	30	23.73	3.81	28.20				

From the previous table, the schoolgirls of the experimental group surpassed the female pupils of the control group in the achievement test. Therefore, there is a statistically significant difference in the level of significance (0.05) between the average score of the female pupils of the experimental group who studied the science according to the wall building strategy and the average score of the female pupils of the control group who studied The same material in the normal way of collection and for the benefit of the experimental group .

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