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Effectiveness Of Strategy Of Preference Pyramid In Achievement Of Science Of Second Intermediate Grade Students

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Abstract

The current research aims to identify effectiveness of the strategy of preference pyramid in achievement of science subject of second intermediate grade students and to investigate the following null hypothesis:

There is no statistical significant difference at the level of significance (0.05) between the scores mean of students of the experimental group who studied the subject of science in the strategy of pyramid of preference and the scores mean of achievement of students of the control group who studied the same subject in the usual method.

To investigate the research hypothesis, the two researchers chose an experimental design partially controlled , the current research community was all students of second intermediate grade in Al-Diwaniyah Governorate for the academic year (2017-2018) , the research sample consisted of (42) students from the second intermediate-grade students from Al-Mi'raj School for Boys in the General Directorate of Diwaniyah Education , (21) Students for the experimental group who studied according to the strategy of preference pyramid and (21) students in the control group who studied according to the usual method. To achieve the aims of the research, an achievement test was prepared of (45) objective item (multiple choice) , the total test score was (45), and the validity of the content has been confirmed for testing and calculation of reliability using Cronbach's alpha equation.

Keywords*: Preference Pyramid Strategy, Achievement*

Chapter One / Introducing The Research

The Problem Of The Research

The teaching process in Iraq faced many difficulties, which led to a low level of achievement in various subjects in general and science in particular, which necessitated those responsible for the educational process to find possible ways to raise the efficiency and improve the performance of students, and from the results of field studies to determine the difficulties of teaching Science at the secondary level in Iraq found that the lack of physical capabilities and the large number of students in the classroom and the overcrowding of the scheduled textbook compared to the planned time for teaching science is one of the reasons for preference of male and female teachers for the traditional method, where we note that most of the traditional teaching methods followed by teachers always focus on Verbal learning by students and its emphasis on information preservation. The problem of low achievement is not the only problem that can be observed in our schools, which has led to a decline in academic achievement and then the low level of students 'scientific level in science and

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through the researchers' understanding of records related to science for some teachers and teachers. They found deficiencies in the following aspects:

- The method of recitation and indoctrination is prevalent in the teaching of science.
- Teachers rarely use modern teaching methods.
- Weakness of scientific background of students in this subject.
- Low level of student achievement in this subject.

These reasons prompted the researchers to search and investigate what contributes to solving these problems, and they found that teaching with a preference pyramid strategy may help to overcome some of these problems and achieve more effective teaching, and then improve the teaching of the subject of science, the second intermediate grade, and improve the student's achievement level based on what The research problem was previously embodied by answering the following question:

(What is the effectiveness of preference pyramid strategy on achievement of second year intermediate school students in the science subject)

Importance of the Research

Educators and specialists in the science curricula and the methods of teaching emphasize that teaching science is no longer just a transfer of the learner's scientific knowledge but rather teaching in general and teaching science in particular has become a process concerned with revitalizing the learner's previous knowledge and building new knowledge and acquiring and understanding it and preserving and using it in different life situations and the ability to link between Science and technology (El-Amrani et al. 2013: 105).

The proposed strategies focus on actively engaging the learner in the educational learning process and helping him to invest his potential energies and developing his mental and thinking skills. These strategies should also help the learner to transfer his experience from specific educational situations to more general and more general life situations, and it should also help him to rely on himself And developing his continuing education trend to use it (Atwi, 2004: 178).

Specialists in the field of education are interested in academic achievement, because it is of great importance in the learner's academic life, because it is about what happens in the educational institution of various and multiple learning processes for different skills, knowledge and sciences indicating its mental and cognitive activity, so one of the most important goals of the educational institution is to raise the level of achievement The academic achievement of its students, and academic achievement as a pedagogical-psychological phenomenon has had a special interest and subject to multiple research and studies. We find that some efforts have tended to search for the mental variables associated with academic achievement, while others have tended to search for motivational, emotional, and social variables associated with academic achievement (Jalali, 2011 : 21).

The achievement of the learner also depends on his preparations, and on the motivations raised by the educational position in it

The needs and inclinations push him to satisfy his need, the more the teacher relied on arousing the learners' motives and inclinations, the greater their enthusiasm for acquiring different experiences and the greater their impulse to achieve the goal, as well as their ability to achieve without tiredness (Jabbour et. al., 2005,74).

The importance of the current research is demonstrated:

1. Presenting a modern strategy that may contribute to solving some difficulties related to learning the huge number of concepts in the science courses and amending the alternative perceptions formed against them.

2. Draw the attention of teachers to move away from the learning that imposes on students and teach them how to think, it is an attempt to overcome the shortcomings of common teaching methods.

3. Draw the attention of those in charge of education to pay attention to individual differences between students and the use of methods and strategies that suit students' abilities, aptitudes and preferences.

4. The results of this study can be a fertile field for those involved in the educational process in general and curriculum developers in particular, by paying attention to the knowledge content of the science curricula.

Third: Aims of the Research The

The current research aims to identify:

The effectiveness of preference pyramid strategy in achievement of intermediate second-grade students in science

Fourth: The Research Hypothesis

There is no statistical significant difference at the level (0.05) between the scores mean of students of the experimental group who studied the science subject according to the strategy of preference pyramid mean degrees on achievement of students of the control group who studied the same subject in the usual method.

Fifth: Research Limits:

The current search is limited in :

1- Governmental intermediate and secondary schools for boys, , in the Directorate of Education of Al-Qadisiyah (Diwaniyah Governorate Center)

2- Chapters (unit one , unit two , unit three) from the science book of the second intermediate grade (part 2) set by the Ministry of Education - General Directorate of Curricula for the academic year 2017-2018, 1st ed. , 2017

3- Intermediate second graders students .

4- The second course for the academic year 2017-2018.

Sixth: Defining the terms

- Effectiveness

Defined byt (Vanden & Gary, 2015): As the ability to achieve positive goals and results represented by a high degree of control and efficiency and evaluating the results.

(Vanden & Gary, 2015: 451)

Strategy of Preference Pyramid : It was defined by:

(Ambo Saidi & Hoda, 2016): As : the students determine the points that are more closely related to the main question before them, in other words, determine preference of ideas in relation to the question before them, while identifying justifications for that.

(Ambo Saeedi and Hoda, 2016: 104)

Theoretically, the researchers define it as:

An educational activity - a learning activity that students collectively undertake with their other colleagues, in which the teacher raises a question and the students determine the best ideas related to the question posed and arranged in a hierarchical form. The base of the pyramid is a place for it, and students must justify the way these ideas are organized.

Procedurally, the researchers define it as:

It is an educational-learning activity as well as one of the active learning strategies that the researchers used to teach the second intermediate grade students (the research sample) collectively with each other, in which the researchers ask a question and the students identify the best ideas related to the question in question and arrange them in a hierarchical form, as the ideas are included The organization in the hierarchical form is one of the most closely related to the question and is placed at the top of the pyramid to the least related to the question.

Achievement: Defined by:

(Barakat, 2005): As : The learner's ability to learn a specific subject is measured by his performance in a test that includes a set of various questions to measure this subject (Barakat, 2005: 108).

(Abu Jadu , 2009): As : The result of what the learner learns after a certain period of time can be measured by the degree obtained by an achievement test, in order to know the success of the strategy that the teacher sets and plans to achieve his goals and the learner's knowledge that translates into degrees (Abu Jadu , 2009: 425).

The researchers adopt the definition (Barakat, 2005) theoretically and define it procedurally:

The set of information and skills acquired by students of both groups (experimental and controlling) in the subject of sciences, and is measured by the degree that they obtain in the achievement test prepared by the researchers for the purposes of this research.

Chapter Two

Theoretical Background & Related Studies

First: Theoretical Background

First: Strategy of Preference Pyramid :

Preference pyramid strategy is one of the active learning strategies, and this education is not limited to a specific theory. Each theory claims that it is able to achieve active learning according to its interpretation of individual learning. The behavioral theory sees that active learning is achieved within the classroom if the teacher is able to provide appropriate reinforcements to students, and these come Seeing through the interpretation of this theory of the learning process, however, that such a theory does not explain mental processes and is satisfied with describing the external effects without paying attention to the cognitive processes that occur within the brain (Ghabari and Khaled, 2009: 48).

Each of the active learning strategies needs before the implementation process a set of steps for careful preparation and preparation by the teacher in order to ensure reaching the desired and desired success and this by creating an appropriate learning environment for students to practice active learning activities, the process of applying these strategies requires the

teacher to do several Arrangements and arrangements within the classroom to suit the learning style that the teacher has chosen for the purpose of education (Saadah et al., 2006: 133).

In this strategy, as the student organizes the ideas hierarchically presented by the teacher or the students design it themselves in the form of a drawing or in an anthropomorphic form, as students put the ideas most related to the question at the top of the pyramid and then less closely and then the most distant from the question at the base of the pyramid, and students must provide Justifications for the reason for organizing ideas in the pyramid, the goal of using the strategy of the pyramid of preference is to train students to work with other colleagues, and to develop thinking and decision-making skills, the implementation of this type of strategy does not require a specific time, as the teacher can implement them at any time period he deems appropriate (Ambo Saidi and Hoda, 2016: 104).

Steps in preference pyramid strategy:

To implement the strategy, the following steps can be taken:

Step1: The teacher attends the requirements to implement the strategy, which are:

Scissors, adhesives, A3 sheets, pictures, writing cards, and hierarchical look.

Step2: the division of students into binary, triple or quadruple groups by the teacher as he deems appropriate.

Step 3: providing color cards for each of these groups. The cards include a variety of ideas that may be sentences, graphics or a picture format related to the main question. Students can also write ideas themselves to benefit from them later in building their pyramid.

Step 4: Students are presented with the pyramid shape with the main question that is placed next to the pyramid. Students can draw the pyramid themselves or do its work in an embodiment

Step5: Students read the ideas that were written in the cards and then determine which are more related to the main question and put it at the top of the pyramid, then the least related and so the process of organizing and arranging ideas continues until the content of the card is less related to the question at the base of the pyramid, then students paste the cards according to their order The hierarchical form provided to them by the teacher.

Step 6: The teacher provides feedback to students about the work done by them, with each group having to provide justifications for the process of classifying ideas and organizing them in a hierarchical form.

Step 7: Students can expand the hierarchical form by using a fish bone regulator to clarify the content of each card presented to them (Ambo Saidi and Hoda, 2016: 104-105).

Second: Related Studies

Given that the researchers did not obtain previous studies on the pyramid strategy of preference and achievement.

Chapter Three

First: Research methodology:

The researchers adopted the experimental approach, because it is more appropriate to the nature of the research and its aim to know the effectiveness of the strategy of the pyramid of preference in the achievement of science subject for the second year intermediate school students.

Second: the experimental design:

It is intended as a plan and work program to implement the experiment, in which the researchers isolate the exotic variables and study the effect of the independent variable in the dependent in order to ascertain the validity of a specific information or to try to reach generalizations that govern the behavior of the dependent variable (Al-Nuaimi et al., 2009, 225).

Group	Variables of Equivalence	Independent Variable	Dependent Variable	Measuring the Dependent Variable
Experimental	-Age by Months -Achievement of parents -Past Knowledge -Intelligence	Strategy of Preference Pyramid	Achievement	Achievement test
Control		Normal Method		

Diagram (1) experimental design research

Third: The research community and its sample:

1- The research community: we mean all individuals who are the subject of the research problem and who can generalize the results of the research to them, therefore the researchers must define the research community precisely and that the search results are limited to the community from which the research sample was chosen (Al-Batsh and Abu Zinah, 2007: 97).

2- Research Sample:

The researchers divided the research sample into two parts: 1 - The schools sample, 2 - The students' sample.

Table (1) the number of individuals in the research sample

Class	Group	Number of students before Repeaters excluded	Number of Excluded students	total number after Exclusion
A	Experimental	**23**	**2**	**21**
B	Control	**24**	**3**	**21**
Total		**47**	**5**	**42**

Fourth: Equivalence of the two research groups

The experimental and control groups equivalence were in a set of variables:

(Age calculated in months, previous academic achievement of science for the second intermediate grade student, intelligence test, academic achievement of parents).

Fifth: Control of non-experimental variables:

The researchers attempted as much as possible to control non-experimental variables that it deems may affect the integrity of the experiment as follows: (time period, academic subject, subject teacher, distribution of shares, measurement tools, experimental extinction, educational methods, physical conditions) (Hamza et al., 2016, 62).

Sixth: Research Requirements:

1- Determining the academic subject:

The identification of study topics is one of the basic tasks in determining educational goals. The scientific subject that was studied for students of the two research groups (experimental and controlling) was determined during the experiment period in the second semester of the academic year 2017-2018 according to the vocabulary of the science subject to be taught to students of the second intermediate grade. And diagram (3) shows that

Unit	Subject
Unit One	Movement and strength
Unit Two	Power and energy
Unit Three	sound and light

Diagram (2) Contents of Units of science book of second intermediate grade (Part 2)

2- Formulating behavioral objectives

After defining the academic subject, the researchers formulated behavioral objectives reached to (124) objectives.

3- Preparing the daily teaching plans:

Preparing the teaching plans of the two research groups (control and experimental), as the number reached (26) teaching plan by five classes per week for each group, as the researchers prepared experimental plans according to the independent variable, preference pyramid strategy, while the control group the researchers prepared their plans according to the usual way.

Seventh: The Research Tool:

The Achievement Test:

The research requires preparing an achievement test to measure the achievement of students of the two research groups at the end of the experiment to know the extent of the impact of the independent variable in the achievement. The achievement of the achievement test included the following steps:

A- Determine the aim of the test:

The aim of the test is to measure the achievement of the students' achievement of academic subjects from the science book set for the academic year (02017-2018) based on the behavioral objectives previously set for that educational content.

B- Determining the number of items:

The researchers identified the test items with (45) items distributed on topics within the research limits for the academic subject and the behavioral objectives that will be measured through the use of a number of arbitrators, specialists in methods of teaching science, specialists in measurement and evaluation, and some science teachers.

C- Preparing the specifications schedule:

The researchers prepared an experimental map that included the science book for the second intermediate grade (Part Two) for the year (2017-2018) and according to the levels Bloom's classification of the field of knowledge (knowledge, comprehension, application, analysis, composition, and evaluation).

Table (2) Table of specifications prepared for the objectives of the achievement test

Chapter	Lessons	Content Percentage	Cognitive Levels					Total %100
			34	40	25	18	7	
			Remembering %27.4	Understanding %32.3	Applying %20.2	Analyzing %14.5	Composing %5.6	
Five	6	%23	3	3	2	1	-	9
Six	10	%38.5	5	6	4	2	1	18
Seven	10	%38.5	5	6	4	2	1	18
Total	26	%100	13	15	10	5	2	45

(45) items were selected from the total behavioral objectives of (124) behavioral objectives based on the test items from the cells of the specification table representing the levels of behavioral objectives (remember, understand, apply, analyze, synthesize, evaluate).

D- Formulation of test items:

The researchers prepared an achievement test consisting of (45) test items of multiple choice type with four alternatives, and the researchers determined their numbers according to the behavioral goals and the importance of the study material to measure the extent of achieving the special behavioral goals according to the levels of the cognitive field (knowledge, understanding, application, analysis, composition , Calendar) from Bloom's Taxonomy.

E- Test Instructions:

The researchers identified the test instructions as follows:

1- Answering Instructions:

Be sure to write your name and division on the test paper, read each test item and the alternatives carefully followed, choose the correct answer from the four alternatives, and the correct answer has only one degree, answer all questions and what you leave is considered a mistake, as it is the wrong or left answer or Containing more than zero replacement, use the pencil for answer only, make sure that you have answered all the test items accurately.

2- Correction Instructions:

The researchers assigned one degree to the item whose answer is correct, and zero for the item whose answer is wrong, and the abandoned item or that carries more than one answer is treated as the wrong item in relation to the test items from multiple, and thus the total score of the achievement test in the range ranges from (0- 45) degrees The number of test items is (45).

F- Validity of the test:

Validity is a good test specification, and the test is valid if it measures what was prepared for its measurement

(Phillips & Stawarski, 2008: 81), so that the test that the researchers have prepared will be true and accurate to the goal for which it was intended:

A- Face validity: In order to verify the validity of the test, the researchers presented the test items in their initial form to a group of specialized arbitrators to judge the extent of the integrity of the items and their suitability for the goals and the level of the research sample and the research goal.

B- The Content Validity:

The researchers prepared the achievement test clauses according to the specifications table, which is considered one of the indicators of content validity.

C- Sons sincerity: It includes the exploratory application of the test

1- **First Exploratory Application**:

The achievement test was applied to a preliminary survey sample consisting of (45) students from the second intermediate class students on Tuesday 17/4/2018 in Al Israa Boys School, after agreement was reached with the school administration on the date of the test procedure, and this is for the purpose of: Clarity of test items, clarity of test instructions, diagnosis of obscure items reformulated, setting time to answer test items).

2- Second Exploratory Application:

The two researchers applied the achievement test to a second survey sample consisting of (100) students on Wednesday 18/4/2018 in Al-Hussein Medium (A) for boys, and after agreement with the school administration on the date of the test, after which the statistical analysis was performed using the following equations:

A- Difficulty coefficient:

The researchers calculated the difficulty factor for the achievement test items and they were (0.54-0.69), as the test items are valid if the difficulty factor ranges between (0.20-0.80) (Alken, 2007: 91).

B- Item Discrimination:

The researchers calculated the discrimination factor for the achievement test clauses by applying the discrimination strength equation, if it finds its value ranges between (0.33 - 0.48), as the item whose discrimination factor exceeds (0.22) is acceptable. (Kubiszyn & borich, 2003: 199)

C- Effectiveness Of Wrong Alternatives:

The researchers applied the formula for the effectiveness of wrong alternatives to calculate the effectiveness of the wrong alternatives for the achievement test, and the researchers found that after applying the equation all had a negative value, that is, they attracted a number of students from the lower group more than the higher group student, so the accepted items are Rani, 2007: 63).

D - Reliability Test Achievement:

Reliability is the ability of the test to give the same results if it is returned to students themselves in the same circumstances, and that the coefficient of reliability test is the statistical indicator of the accuracy of the test, and it is good and high whenever its value approaches one (Fraenkel & Wallen, 2006: 150), the researchers used Cronbach's alpha equation To calculate the reliability of the achievement test if its value reaches (0.91) which is a high reliability coefficient.

E- The Final Form Of The Test:

After the two researchers extracted the psychometric properties of the achievement test items and made sure of the clarity of all the items, the clarity of the answer instructions, and the calculation of the time taken to answer the test items, the achievement test for the two research groups students became ready for application, and it consisted of (45) test items.

Eighth: applying the experimental procedures

1- The two researchers applied the experiment in the second semester of the academic year (2017-2018) on Tuesday, (20/2/2018) on the research sample of (50) students with (25) students in each of the control and experimental groups up to Sunday, 22/4/ 2018, meaning that the experiment lasted for two full months, eight weeks and five lessons per week for both research groups.

2- The researchers collected data for the two research groups in the previous academic achievement, the first course degree for students in the science subject, as well as the academic achievement of parents, in addition to that time age calculated in months from the official intermediate records of Al Maraj boys.

3- The researchers applied Raven's IQ test on Wednesday (21/2/2018.

4- The experimental group was taught according to preference pyramid strategy.

5- The control group was taught according to the usual method.

6- The achievement test was applied to the students of the two research groups on and on Tuesday 24/4/2018, and the researchers informed the students about the test date three days before the application of the test and asked the students to read the test instructions carefully before starting to answer the test items, and the answers were corrected According to no typical previously prepared answer.

Ninth: Statistical means

(T-test for two independent samples, Chi square, difficulty coefficient, discrimination equation, Pearson correlation coefficient, effectiveness of wrong alternatives , Spearman-Brown equation, K-R 20 equation)

Chapter Four

Presentation and Interpretation of Results

First: View The Results

In order to verify the research goal, the null hypothesis was tested as follows:

1- To verify the validity of the null hypothesis, the researchers calculated the arithmetic mean and the T value by using the T-test for two independent samples to compare between the scores mean of students of the experimental group and the scores mean of the students of the control group in the achievement test, as shown in Table (3)

Table (3) the significance of the difference between the experimental and control groups in the achievement test

Group	N	Mean	Std. Deviation	df	t.test		Statistical Sig.
					value	tabled	
Experimental	21	23.476	2.803	40	7.286	2.021	Sig. at level (0.05)
Control	21	17.047	2.747				

From table (3), it is clear that the scores mean for students of the experimental group in a test is (23.476), with a standard deviation of (2.803), while the scores mean for the students of the control group was (17.047), with a standard deviation of (2.747), and that the calculated T value was (7.286), which is greater than the tabular value of (2.021), with a degree of freedom (40), and at the level of significance (0.05), which indicates a statistically significant difference between the scores mean of students of the two research groups (experimental, and control) in favor of the experimental group, and this It means that teaching using preference pyramid strategy was more effective in increasing achievement for second-year intermediate school students in science than teaching in the usual way, and based on that the null hypothesis was rejected.

Effect size and as a confirmation of that result, the researchers deliberately calculated the practical significance of the results by applying (η2), which is used to determine the degree of significance of the result, which has been statistically proven, and its value was (0.754), which indicates a significant effectiveness.

Table (4) Impact Size Values

Value of (η2)	**Effect Value**
(0.29 - 0.10)	**Small**
(0.49 - 0.30)	**Middle**
(0.50and more)	**Large**

(Gravetter & Larry, 2017: 253)

Second: Discussion Of The Results.

The researchers attribute the difference between the experimental group students and the control group students to the following:

1- Preference pyramid strategy, which is one of the modern teaching strategies, led to a great interaction of students with the subject during the lesson and active participation in it, and increased their activity and care for the prescribed topics ..

2 - The use of traditional methods that emphasize memorization and instruction in teaching causes boredom to students in science studies, as well as making them passive who receive a lot of information without taking care to stimulate thinking.

3- Teaching according to this strategy encouraged students to think, because the stimulating classroom environment helped to develop thinking capabilities

4- Preference pyramid strategy contains various educational activities that help in cooperative work and make the science class a likable for students.

Third: Conclusions.

In light of the results of the current research, the researchers concluded the following:

1- Teaching by preference pyramid strategy has a great effectiveness in developing achievement in the experimental group, compared to the control group that was studied in the usual way.

2- The use of the pyramid of preference strategy in teaching science is based on the interaction between the teacher and the student and between the students themselves as well, and when applied it achieves the goals of education very efficiently, and makes it easier for students to learn the subjects.

3- Teaching using the pyramid of preference strategy encourages students to be free to ask questions and raise them greatly, and their positive participation in classroom dialogue and discussion during the lesson and express their opinions and ideas completely freely and this is an indication of their obtaining an internal motivation for learning.

Fourth: Recommendations

In light of the results reached by the researchers, they recommended to do the following:

1- The establishment of training courses by the Department of Preparation and Training for science subject teachers and introducing them to importance of this strategy used in teaching .

2- The attention of the Educational Supervision Directorate in directing modern teaching methods that have proven successful, and avoiding the prevailing methods of preservation and indoctrination, which makes the student a recipient of information without paying attention to stimulating thinking.

3- Attention of the Curriculum Directorate in the Ministry of Education in preference pyramid strategy, and including it in curriculum design and planning.

Fifth: Proposals

To complement what the researchers have done in the current research, they suggested that the following be done:

1- Studying the effect of using preference pyramid strategy in the science subject for other academic stages.

2- Studying the effectiveness of the strategy of the pyramid of preference in other variables than achievement , such as: critical thinking, creative thinking or productive thinking.

3- A study on the effect of using preference pyramid strategy in attitude towards science.

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