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The Impact of Using Alen Hover's Strategy on the Achievement of Second-Grade Intermediate Students in Science

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Abstract:

The aim of the research is to identify the impact of using the Alen Hover strategy on the achievement of second-grade intermediate students. To verify the goal of the research, the researcher put the null hypothesis, which states that: There is no statistically significant difference at the level of significance (0.05) between the average scores of the experimental group students who studied according to the Alen Hover strategy and the average scores of the control group students who studied according to the usual method in the achievement test. An experimental design with two experimental and control groups and with a post-test for the achievement variable was chosen. The research community represented the second grade average students in Ibn Aqil Intermediate School, for the academic year (2020-2021), which numbered (45) students divided into three study divisions, the two groups were rewarded with variables (previous information test in science, intelligence test, previous achievement in science), the scientific material was specified in the first and second units of the science book for the second intermediate grade, the Ministry of Education, for the year 2020. The experiment was applied in the first semester of the academic year (2020-2021), the necessary teaching plans were prepared, amounting to (16) plans for the experimental group, and the same for the control group, As for the research tools, the researcher prepared the achievement test, which consisted of (35) items of a multiple-choice type, which included (remembering, comprehension, application, analysis and synthesis), the validity and stability of the test were confirmed, as well as the extraction of psychometric properties. The results of the research, using the qui-test for two independent samples, showed that the students of the experimental group who studied according to the Alen Hover model excelled over the students of the control group who studied according to the usual method in the achievement test. From these results, the researcher concluded that teaching using the Alen Hover strategy has an impact on students' achievement, as the impact size was (0.44), and accordingly the researcher made a number of recommendations and suggestions related to the results of the research.

Keywords: Impact, Hover Strategy, Achievement

Introduction

Research Problem

Our current era is witnessing rapid development and change in all fields of knowledge and the methods of its application. Science books in the middle school witnessed several changes that were reflected in the vocabulary and output of the school curriculum and in the multiplicity of aspects of its composition, topics and objectives in general and the science curriculum for the second grade in particular, and this change was also reflected in the methods of obtained, which had an impact on the methods and methods of teaching science, the researcher looked at the science book for the second intermediate grade and found that it contains a variety of activities, including (exploration, problem solving) and provides the opportunity to conduct scientific experiments and use educational aids, the material attracts the learner and his eagerness to explore, and this indicates, however, the book does not complain of any shortcomings in its inclusion of scientific material and activities.

Teaching the science book for the second intermediate grade requires following various and different methods and methods according to the diversity of content, topics and experiences, and with the clarity of that vision, but the reality of science teaching in our schools is still not at the level of ambition, however, there are many science teachers who use traditional methods, as these methods depend on explanation and theoretical information or reconfirm knowledge as mentioned in the book and communicate it in a way that does not help raise the level of achievement to the required level, this reason led to a lack of response by students and their participation in the educational process, and that the student listens to what the teacher says only without any participation, which leads to the loss of the expected benefit from the material, and these indicators are reflected on the subsequent educational stages, and through the researcher's review of many studies Which used new teaching methods and methods in teaching science, which dealt with the problems of the lack of low level of achievement, including the study of (Al-Rabi'i, 2014), (Al-Saadi, 2015), and (Al-Massoudi, 2016).

It was found that the results referred to by these studies agree that the methods of teaching science followed led to a decrease in the level of achievement, the researcher believes that this research is an experimental attempt in which one of the educational problems related to teaching science for the second intermediate grade may be addressed by adopting the Alen Hover strategy to know its impact on achievement, so the researcher will try to answer the following question:

What is the impact of (Alen Hover) strategy on the achievement of second-grade students in intermediate sciences?

1. The importance of using modern teaching strategies, especially Alen Hover's strategy.
2. The scarcity of studies that dealt with Alen Hover's strategy in acquiring science.
3. The importance of science, which is considered one of the basic subjects for the intermediate stage.
4. The research contributes to helping teachers develop the traditional method common in our schools, by employing Alen Hover's strategy, which can be used to teach science.

5. The current research may be a qualitative addition to learning resource centers, as it can benefit researchers and graduate students.

Research objective and hypothesis

The current research aims to identify the impact of teaching science using the Alen Hover's model on the average achievement of second-grade students, and the goal will be achieved by verifying the validity of the following hypothesis: There is no statistically significant difference at the level (0.05) between the average scores of the experimental group students who study according to Alen Hover's strategy and average scores of the control group students who study according to the usual method in the basic science operations test.

Third: Research objective and hypothesis

The current research aims to identify the impact of teaching science using the ALEN HOVER model on the average achievement of second-grade students, and the goal will be achieved by verifying the validity of the following hypothesis: There is no statistically significant difference at the level (0.05) between the average scores of the experimental group students who study according to ALEN HOVER strategy and average scores of the control group students who study according to the usual method in the basic science operations test.

Research Limits: The research was limited to:

1- **Spatial limit:** Intermediate and secondary day schools (governmental) for boys affiliated to the General Directorate of Education in Baghdad Governorate - Abu Ghraib District.
2- **The cognitive limit:** Unit one: Elements and compounds

Chapter One: Elements and Chemical Bondin

Chapter Two: Chemical Compounds

Unit 2: Chemical reactions and solutions

Chapter Three: Formulas and Chemical Reactions

Chapter Four: Solutions

3- **Human limit**: second graders are average.
4- **Time limit**: the first semester of the academic year (2020/2021 AD).

Defining terms: The following defines the meanings of the terms mentioned in the research:

Alen Hover's strategy:

(Unks, 2005) as: “The modern method of teaching that depends on individual learning, which is limited to employing the basic capabilities of learners in which they work in small homogeneous groups in terms of abilities and scientific background and interact with them towards achieving

common goals, as the learners face a problem and are asked to work on Solve it by using the means and devices to discover the required information and facts. (Unks, 2005: 8)

- Achievement and difined it:

(Abu Jadu, 2009) that: "The outcome of what the learner learns after a period of time has passed, and it can be measured by the degree he obtains in an achievement test, in order to know the extent of the success of the strategy that the teacher sets and plans to achieve his goals and what the student obtains of knowledge is translated into grades (Abu Jadu, 2009: 469).

- The researcher defines it procedurally as: the amount of information acquired by the second grade average students in science for the first and second units as measured by degrees through their answers to the items of the achievement test consisting of (35) objective multiple-choice items prepared by the researcher for this purpose.

Theoretical background and previous studies

First Axis: Alen Hover

Alen Hover's strategy is one of the strategies of learning by free exploration that is based on the learner's self, where the learner is the main focus and center in the learning process. related to educational learning theories in all sectors, Alen Hover's strategy can be represented in a number of successive steps that the learner goes through during the educational situation in order to reach a solution to any problem he faces, as it requires him to use information and ideas he previously learned, which leads to the generation of new ideas that help him in the search for solutions to the problem, this is done by organizing and re-discussing ideas and linking the relationships between ideas about the problem, one of the most important goals that can be achieved using this strategy is to open the space for the learner to fully express the ideas without limiting them and restricting them in a narrow framework, thus producing the largest possible amount of new ideas while reducing the severity of criticism or judgment by the teacher, because criticizing ideas during their presentation may lead to frustration and confusion of the learner and prevent him from generating other ideas (Abu Helu, 1988: 74).

The steps that the scientist (Hover) follows in implementing his strategy:

1- Explanation and clarification of the scientific material: the concepts are presented in an organized manner and help the learner to explore the information and confirm its importance and link it to the reality of life, as it progresses with the learner using guided exploration and then moves to the free exploration of the concepts, stressing on some work rules and the importance of time.

2- Experimentation, application and manual practice phase: This phase focuses on what the learner explores and turns it into a logical structure after following up on his work.

3- Using ideas in different new forms: After integrating knowledge with the learners' experiences and experiences, and challenging them to review what happened.

Hover divided the learners into heterogeneous groups for study and study, and each team consisted of (5-6), as each learner was responsible for learning part of the material. Sarman, 2004: 78))

The procedural stages of applying the strategy (Alen Hover) in the lesson:

1. Watching phase: At this stage, the teacher presents pictures or shapes in front of the students and asks them to watch these shapes to identify them and answer the questions asked about them.
2. The verbal formulation phase: After viewing the pictures and figures presented to the students and discussing them, a definition or concept is formulated for them and can be distinguished between them.
3. Conclusion phase: the teacher presents the pictures or figures again and directs questions to the students and allows the members of the same group to cooperate among themselves to reach the correct answer, as the teacher reaches with his students a rule, a law, or a relationship.
4. Application phase: This stage is the stage of evaluating the students' level through their answers. (Alwan, 2019: 27)

The second axis: previous studies

5. There are no studies that dealt with the impact of teaching with the ALEN HOVER model in teaching science to the second intermediate grade (according to the researcher's knowledge), but they found a number of studies that used the ALEN HOVER strategy as an independent variable and its impact on other dependent variables (achievement, engineering thinking). (Al-Ezzi, 2012), (Nasr, 1998).

Research Methodology and Procedures

Research Methodology: The researcher adopted the experimental design to verify the research objective and its hypotheses. Experimental design is defined as a work strategy through which the procedures for carrying out the experiment are carried out and the conditions and factors surrounding the experiment are planned so that the researcher can observe the differences in order to reach accurate results about the relationship between the independent variables and the dependent variable (Hamza et al., 2011: 63).

Research Procedures:

1- Experimental Design:

The researcher chose the experimental design with two groups (experimental and control), one of which is partially controlled, and the other with a post-test (for the achievement of science), because it is suitable for the purpose of the research and to verify the validity of its hypotheses. As shown in diagram (1)

Scheme (1) Experimental design of the research

Group	Parity	Independent variable	dependent variable
Experimental	- Previous information - Intelligence - Previous achievement in science	ALEN HOVER STRATEGY	Achievement
control		Usual way	

Research community and sample:

A- Research Population Determination:

The research community includes all the vocabulary of the phenomenon that the researcher is studying.

The research community was determined by all students of the second grade average who study in (government) day schools for boys affiliated to the General Directorate of Education in Baghdad Governorate - Abu Ghraib District for the academic year (2020/2021 AD).

B- Research Sample: The researcher chose (Ibn Aqeel Intermediate School for Boys) to conduct the experiment of the General Directorate of Education in Baghdad Governorate - Abu Ghraib District, to represent the research sample, and it contains four sections and consists of (45) students of the second grade average By simple random assignment, Division (B) was chosen, representing the control group, whose students will study science according to the usual method, and their number is (15) students, and Division (C) represents the experimental group whose students will study science according to Alen Hover's strategy, and their number (15) students.

Croups Equivalence:

Despite the random homogeneity of the sample members and being from one environment, the researcher was keen before commencing the experiment on the equality of the two research groups (experimental and control) in some variables believed to interfere in their impact with the independent variable (ALEN HOVER model) in the dependent variable (achievement), which are: -

A- Previous achievement in science for the previous academic year
B- Testing the previous information in science
C- intelligence

The researcher equalized the two research groups in the variables mentioned in the first semester before starting the application of the experiment, as in Table (1).

Table (1) Statistical significance of the equivalence variables between the two groups

Variables	the group	Number	Arithmetic average	Standard deviation	Calculated F value	Table F-value	Significance level (0,05)
Examination of previous knowledge in science	Experimental	15	13,06	3,239	0,275	3,21	Non-function
	control	15	126,668	4,029			
Previous achievement test	Experimental	15	61,333	22,799	0,181		Non-function
	control	15	63,066	22,726			
Intelligence Test	Experimental	15	15,666	4,134	0,794		Non-function
	control	15	16,866	3,502			

It is intended to control the extraneous variables in the phenomenon to be studied by fixing or equalizing them so that they do not affect the results of the experiment. Therefore, these factors are fixed in terms of quantity and type (Zangana, 2007: 480).

The non-experimental variables that could affect the accuracy of the results of the experiment were controlled, and the following are the most important extraneous variables:

For this purpose, the researcher set the following variables:

A- Experimental conditions and associated accidents
B- Processes related to maturation
C- Measuring instruments
D- Experimental extinction (discontinuation from experience)
E- The effect of other experimental procedures, including (confidentiality of the experiment, academic content, duration of the experiment, school building, distribution of classes).

The Research's Requirement:

1- **Determining the scientific subject:** The scientific subject that the researcher will teach during the duration of the experiment has been determined, which is represented in the first and second units, which include chapters (first, second, third and fourth) of the science book for the second intermediate grade, for the year (2021 AD).
2- **Formulation of behavioral goals:** The researcher analyzed the content of the current research represented in the first and second units, which include the first four chapters of the science book for the second intermediate grade, for the year (2021), with the aim of formulating behavioral goals according to Bloom’s classification in the cognitive domain, which includes its first five

levels, namely (remembering , comprehension, application, analysis, synthesis), as (172) behavioral objectives were formulated.

Fourth: - The Research's Tool: The current research requires the preparation of a tool to measure the dependent variable (basic science processes), from which we can get acquainted with the extent to which the research objective and its null hypothesis have been achieved, the following is an overview of the test preparation procedures:

A- **Determining the objective of the test**: The test aims to measure the achievement of the students of the three research groups in the contents of the current research represented in the first and second units, with two chapters for each unit, which are prescribed in the science book for the second grade average for the academic year (2020-2021 AD).

B- **Drafting the test items:** After reviewing a number of Iraqi and Arabic research and studies and some literature and sources, the researcher prepared the achievement test items, which amounted to (35) items of the type of objective tests, i.e. multiple choice, where four alternatives were identified for each test item, three of which are Wrong and one of them is the correct answer.

C- **Setting test instructions:** After formulating the test items in its initial form, the instructions for answering the test items were developed so that they are clear to everyone and included giving students an idea of the purpose of the test and the overall test score, as well as other indicative instructions represented by setting an example showing how to answer the items and not leaving An item without an answer and not choosing more than one answer for one item.

D- **Test correction instructions:** A student is given one mark if he chooses the correct alternative, and a score of zero if he chooses one of the wrong alternatives or in the case of leaving the item unanswered, or when choosing two alternatives together, depending on the answer keys, and thus the student's score for the objective items It is determined by the range (0-35) degrees.

E- **The validity of the test:** In order to verify the validity of the test, the researcher must do the following:

1- Virtual validity:

The researcher presented the items of the achievement test to a group of experts and specialists in curricula and methods of teaching science, measurement and evaluation, with the aim of knowing their views on the validity of the test items, the soundness of their formulation, the levels measured by the behavioral goals, and their suitability to the levels of the research sample students, after receiving the answers, the researcher modified, in light of the experts' opinions, a number of items, in terms of wording and language, he items were considered valid, as it obtained the approval of (80%) of the opinions of the experts, and no item was deleted. Thus, the number of items remained the same (35), all of which are valid for measuring academic achievement in science.

2- **Content validity:** it is the test that measures the content of the study subject to be measured, and the validity of the content requires two things: the validity of the items as they represent the academic content, and the validity of the preview in terms of the inclusion of the test items of the content of the study material (Abdul Rahman, 2017: 87)

F- reconnaissance application:

1- Applying the test to the first exploratory sample: its purpose is to reveal the clarity of the items, and the instructions for answering, to determine the time of the test, the researcher applied the test to an exploratory sample consisting of (30) students of the second grade average in (Al-Zukhrouf High School for Boys) on Tuesday corresponding to (1/26/2021 AD), and the researcher personally supervised the application of the test, where the researcher clarified the test items, and how to answer, and after the students finished the answer, it became clear that the instructions are clear and that all the items are understandable, where the average time was calculated by means of an equation prepared for this purpose, the average time was (39) minutes by calculating the end time of the answers of all students by fixing the response time of each student, the response time of the first three students, the response time of the last three students, and the arithmetic mean of them were taken.

2- Applying the test to the second exploratory sample: to find the psychometric characteristics of the test, and to determine the efficiency and effectiveness of its items, and for the purpose of improving the test by identifying the shortcomings in its items and detecting and excluding invalid items, after the clarity of the test items and instructions and the time taken to answer in the first exploratory test were confirmed, the test was re-applied a second time on an exploratory sample of second grade average students in the middle school (Izz al-Din al-Qassam for boys) on Wednesday (3/2/2021). The achievement test was applied to (100) students, after correcting the answers, the scores were arranged in descending order from highest to lowest and were divided into two groups. The highest (27%) of the students' answers were taken to represent the upper group and the lowest (27%) of the students' answers to represent the lowest group

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G- **Statistical analysis of the items:** After applying the exploratory test, the psychometric characteristics of its items were calculated, which include:

1- Item difficulty coefficient: The difficulty coefficient of each of the test items was calculated using the difficulty coefficient equation, and it was found that it ranges between (0.34-0.58), as the test items are considered acceptable if their ratio ranges between (20,0-80). , 0).

2- The discriminatory power of the items: the discriminatory power was calculated for each of the test items and it was found to range between (0.36-0.78), which is a good indicator of the acceptance of the items in terms of their discriminatory power.

3- Effectiveness of alternatives: After applying the equation with the effectiveness of alternatives for the answers of students from the upper and lower groups, it was found that the wrong alternatives for the post-test items were attracted to it by a number of students of the lower group more than the number of students of the upper group, where the coefficient of effectiveness of the alternatives was negative, so it was decided to keep them all without deletion or modification.

H- **Test stability:** The researcher calculated a proof for the purpose of verifying the stability of the correction, where the researcher divided the scores of the second exploratory sample of (100) students into two groups, one representing the scores of individual items and the other representing the scores of even items, then calculating the Pearson correlation coefficient in a way split half, the

Pearson correlation coefficient reached (0.90), and when corrected by the (Spearman-Brown) equation, it reached (0.94), as the tests are good when their stability coefficient reaches (0.70) or more, which indicates that the stability coefficient was good and valid for application.

Procedures of Applying the Experiment:

The actual teaching of the experiment began on Monday (14/12/2020), and the teaching ended on Sunday (14/2/2021 AD). And by two sessions per week for each of the experimental group and the control group.

1- **The experimental group:** It was taught according to the strategy of Alen Hover, and according to the daily teaching plans.
2- **The control group:** it was taught according to the plans that were prepared in advance in the usual way.
3- **Application of the test:** After completing the teaching of the prescribed material from the science book for the second grade average for the first and second units, the achievement test was applied on Sunday (2/14/2021) after informing the students of its date a week before the application.

Research results, recommendations and suggestions

Presents the results

The arithmetic mean and variance of the research groups were calculated, as the arithmetic mean of the experimental group was (29,3333) with a standard deviation of (4,30393), while the arithmetic mean of the control group was (23,8667) with a standard deviation of (5,13902), as in the table (2).

Table (2) The mean and standard deviation of the three research groups

Group	Sample volume	Arithmetic average	Standard deviation
Experimental	15	29.33	4.304
control	15	23.87	5.139

The researcher adopted the Sheffe method for dimensional comparisons because it is a preferred method for multiple dimensional budgets, and Table No. (3) shows this:

Group / Experimental	Sample volume	Arithmetic average	The difference between the squares	Probability value	Statistical significance at the 0.05level
Control	15	29.33	5.46667	0.019	Function
	15	23.87			

From the above table, it was found that the arithmetic mean of the scores of the students of the second experimental group who studied science according to the strategy (Alen Hover) amounted to (29,3333), and that the arithmetic mean of the scores of the students of the control group amounted to (23,8667), in order to find out the significance of the differences between the average scores of these two groups using the Sheffe method, it was found that the mean value of squares (5,46667) is greater than the probability value (0.019) at the significance level (0.05) and the degree of freedom (42) and this indicates that there is a difference between the average scores the students of the two groups and in favor of the experimental group, thus rejecting the null hypothesis, which states (there is no statistically significant difference at the level (0.05) between the average attainment of the students of the second experimental group and the students of the control group who studied science according to the usual method) and thus accepts the alternative hypothesis.

Impact size: The impact size was calculated to show the impact of the independent variable (Alen Hover) strategy on and the dependent variable (Achievement) as shown in Table (4).

Table (4) The size of the impact on the achievement test

Independent variable	Dependent variable	The value of the impact size	The size of the impact
Strategy (Alen Hover)	Achievement	0,44	large

It is clear from Table (4) that the impact size on achievement has reached (0.44), which is a high indicator according to the criteria shown in Table (15).

Table (5) A suggested reference table for determining the levels of impact size for each of the impact size measures

The tool used	Impact size		
η	Small	Medium	Large
	0.01	0.06	0.14

(Afaneh, 2004:42)

Interpretation of the results

The results showed that the students of the experimental group who studied science according to Alen Hover's strategy outperformed the students of the control group who studied science according to the usual method in the achievement test of science for second-grade students, average, and the reason is attributed to:

1. The use of Alen Hover's strategy stimulated the students to feel high confidence in the personality, through the freedom granted to them, which makes the students explore knowledge and sciences on their own, and the exploration process enhances self-confidence and a sense of achievement.
2. Alen Hover's strategy plays a role in organizing the educational material and the nature of its presentation, in the form of a problem or an open question looking for a solution through the

educational strategy and the educational means that are used, which contributed to making students more ready to accept the scientific material, this strategy draws students' attention towards the lesson, and this increases the students' exploration process and motivates them to search for appropriate information and use it to solve the problem they face. It also increases the students' opportunity to understand the scientific material represented in science, presenting the material in this way makes the learning process attractive to students because it links the material to the students' daily life.

3. The method of learning by discovery provided by Alen Hover's strategy makes learning the rest of the impact, as students remember the information for a long time, and thus positively affect the aspects of the learning process and this is done by going through the experiences of exploration during the teaching process.

Conclusions: In light of the research results, the researcher reached the following conclusion: Teaching using Alen Hover's strategy led to an increase in the achievement of second-grade students in the middle school in science.

Recommendations: In light of the results of the current research, the researcher recommends in the curriculum:

1. Paying attention to the use of modern educational strategies, including the strategy of (Alen Hover) in teaching science, because of its impact on raising the level of achievement.
2. Urging male and female teachers to provide freedom for students to participate and express their opinions, and work to create a social educational climate that develops mutual human relations.
3. Holding training courses for teachers during the service to train them to use the strategy (Alen Hover) and employing them in raising the level of achievement.
4. Urging the colleges of education in Iraqi universities to prepare their students according to modern strategies, especially active learning strategies and exploration learning strategies.

Suggestions

1. Conducting a comparative study between Alen Hover's strategy and other strategies to find out the impact of each on achievement or other dependent variables such as lateral thinking, analytical thinking, multiple intelligences, creative thinking, critical thinking.....).
2. Conducting similar empirical studies on the impact of using the (Alen Hover) strategy in different study subjects such as physics, biology or mathematics, and for other academic levels.
3. Conducting studies similar to this study in different stages of study and in different study subjects.

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