



THE EFFECTIVENESS OF A PROPOSED STRATEGY BASED ON COMPLEMENTARY LEARNING IN ACQUIRING SCIENTIFIC CONCEPTS AMONG MIDDLE SCHOOL STUDENTS

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Article history:	Abstract:
Received: 7 th April 2025 Accepted: 6 th May 2025	<p>The research aims to identify the effectiveness of a proposed strategy based on differential learning in acquiring scientific concepts among middle school students. To achieve the research objective, the researcher adopted the descriptive and experimental research methodologies. The descriptive method was adopted in constructing the proposed strategy, while the experimental method was chosen for the experimental design of two equivalent groups. The researcher chose a sample of second-year middle school students distributed into two sections (A, B). Section (A) was chosen randomly to represent the experimental group and its number of students was (30). In the same way, Section (B) was chosen to represent the control group and its number of students was (30). The research sample in both groups amounted to (60) students. The researcher statistically rewarded the students of the two groups in the following variables: (chronological age calculated in months, previous information test, intelligence test, and previous achievement). The researcher specified the study material in the three chapters of the chemistry book for the second-year middle school. Then the researcher formulated behavioral objectives, the number of which amounted to (156) behavioral objectives representing the six cognitive levels of Bloom's classification in the cognitive domain. As for the research tool, the researcher constructed a test for acquiring scientific concepts, which consisted of (60) test items. The validity, discrimination coefficient, difficulty, effectiveness of alternatives, and stability were verified. The researcher used appropriate statistical methods to extract data, and the results showed that the students in the experimental group outperformed the students in the control group.</p>
Keywords: Proposed strategy, allometric learning, acquisition of scientific concepts	

Chapter I

Introducing Research

First: Research Problem:

Learning the concept has become a priority of educational goals at all levels of education. The main concern of teachers, teachers, curriculum experts and educational material designers is to identify concepts that students can learn sequentially at higher levels of learning. Preserving facts and information is no longer a learning goal. These facts and information are soon forgotten. Students quickly forget separate facts; Therefore, the design of education that focuses attention on the relationships between facts and concepts within a conceptual framework makes it more effective and puts an end to the problem of students' invoking and preserving information without discrimination. As a result, school learning tends in large part to teach and develop concepts, as it is a necessary basis for a more complex knowledge pyramid such as principles, generalizations, laws and theories (El Ghazali, 2020:31)

Chemistry has begun to be taught like other subjects, relying mainly on the preservation and remembrance of information, Students' achievement is estimated to be as high as their scientific and theoretical realities, the employment of which has no impact on their lives. and this may be due to problems in the teaching of chemistry, such as the lack of adequately trained chemistry teachers and the lack of laboratory materials, The lack of laboratory materials affected teaching methods rather than the students' own experiments in order to discover the facts (Al-Rafei, 2019:52)

The predominant quality of teaching at present is teachers' use of preservation-based teaching methods and methods and the presentation of scientific material teaching a particular concept of a teacher's body, which has led to stereotypical and similar teaching of most lessons, The lack of interest in linking them in a way that appears in the

student's structure of integration and balance between them makes the concepts and ideas distracted in the minds of students and prone to forgetting and misunderstanding them (Tutt, 2021:42)

Based on the foregoing, the researcher considered that an experimental confirmation attempt should be made as a proposed strategic preference on the basis of enlightened learning among middle and high-school students. The research problem can be identified:

What is the effectiveness of a proposed strategy based on inclusive learning in acquiring scientific concepts in middle school students?

The importance of research:

Knowledge, facts and information are unchanged and subject to continuous and increasing development as a result of increased research and scientific studies produced in the light of the advancement of scientific devices and means. Educational staff in all their disciplines must adapt to these discoveries and developments (Hariri, 2020:36).

Therefore, the aims of scientific education are to provide students with a range of expertise and information needed to be aware of what they learn and able to keep up with contemporary life. The student's life is based on the acquisition of the right scientific education and the mechanism of research on development as he ages, which is first acquired from the family surroundings and then later moved to the surroundings of his school and his experiences through it. In all respects, it seeks to prepare its own humanity and instill values in the same student (Daniel, 2022:61).

Teaching is based on post-structural models of modern trends in learning and knowledge acquisition that aim to achieve tangible results for students based on self-dimension and utilization of special skills in different fields of knowledge through deep and extensive study and attention to searches for information in diverse sources and focusing on the process of generating sub-questions that follow these steps, elaborate knowledge outcomes that can be employed in new postbuilding situations to help students develop knowledge-study skills in interpretation, analysis and assessment, A study on the debriefing of information minutes and their fundamentals, and the research behind them of absent ideas and information, This gives students the opportunity to move towards new heights through which to navigate their acquired information generated through rich, diverse and sourced study. information ", which qualifies them to reach the stage of analysis and comparison of information, Determining what they deem appropriate, reflecting their deepening knowledge and complementarity (Janabi, 2018:97).

André Gorden (Giordn Andre) is the founder of full-time learning and analytical study of different learning theories, and then structured those theories into three axes or factors: knowledge, society, and individual, and He found that most of the current theories are very close to one of those three components, that is, they focus on only one factor, while Gordon designed spontaneous learning at the point of convergence of several factors as an attempt to fill this gap and integrate the three factors (Borja, 2017:84).

Understanding concepts plays a crucial role in helping students retain, use and apply knowledge in a variety of contexts. This acquisition depends on several factors, including the student's cognitive status, which indicates the student's knowledge of previous concepts, which are the basis for acquiring new concepts. The student's loss of previous concepts negatively affects his ability to understand and absorb new concepts (Crans, 2020:29).

The importance of teaching and learning concepts for everyone studying science is no longer disputed. The pedagogical literature emphasized that concepts are one of the most important levels of building the knowledge structure of science on which the rest of the knowledge levels are based. Concepts are one of the most important learning products through which a student's scientific knowledge can be regulated (Jesse, 2021:71).

Students' correct acquisition of concepts plays a key role in helping them to remember what they have learned. The school curriculum is based on scientific concepts as a tool for thinking and investigating. Therefore, attention must be intensified to the development and formation of these concepts in students, especially as they are usually produced through perceptions of the five senses, imaginations and the production of fictional thought and memories (Al-Hadidi, 2020:45).

The importance of current research can be summarized by the following points:

1. This research adopts recent trends in the teaching of chemistry, because the proposed strategy refers to modern methods that emphasize the student's role and give him the greatest importance in the educational process.
2. The research seeks to acquire students' scientific concepts in general and chemical concepts in particular by extracting them from the text and linking them to subconscious concepts and related phrases and by creating meaningful sentences.
3. The importance of inclusive learning in knowledge acquisition as an effective and effective model.

Third: Research objectives and hypothesis:

This research aims at:

1. Build a strategy based on full-time learning.
2. Know the effectiveness of a strategy based on inclusive learning in acquiring scientific concepts in middle-level students

To achieve the researcher's objectives, the researcher drafted the following zero hypothesis: (There is no statistically significant difference at 0.05 between the average grades of the pilot group students who will study chemistry according to the proposed strategy and the average grades of the control group students who will study the same subject in the scientific conceptual acquisition test prepared for the purposes of this research).

Fourth:limits of reserch

The present research will be limited to:

1. Spatial limit: Only government secondary and middle schools under the Directorate General of Qadisiyah Education
2. Time limit: Second semester of the academic year (2024-2025).
3. Human threshold: second grade students average.
4. Cognitive Limit: Chemistry Book for Grade 2 Intermediate.

Fifth: Definition of terms:

1. Interactive learning defined

- **(Besters, 2023)** states: "One of the post-constructive models describes the mental processes occurring in the student's mind, as well as the external factors that make the learning process easier, and creates a highly efficient learning environment that interacts with the student's learning processes. Teaching and learning according to this model takes place in five steps: problem, references, mental processes, semantic network, connotations" (Besters, 2023:26).
- **Theoretical definition:** a modern educational model based in its principles on constructive theories, confirming active learning in its steps that begin with identifying the problem, then references, the practice of mental processes, the work of the semantic network, to reach important conclusions and connotations.
- **Procedural Definition:** A constructive educational model on which to build the proposed strategy against which middle second grade students (research sample) were taught, in order to acquire biological concepts.

2. Acquisition of concepts defined by:

- **(Saleh, 2014)**: "Abstract wording of the characteristics common to a set of articles, facts or positions, and usually given a name, word or title, including a logical relationship between relevant information" (Saleh, 2014:54).
- **Procedural definition:** The mental image that is generated by students in the second grade is meaningful and meaningful and that students arrive at through the proposed strategy according to speculative learning and expresses this mental image through a word, sentence, symbol or image.

Chapter II

Theoretical framework and previous studies

First, post-constructive models:

Post-constructive models attempt to introduce new, innovative methods, based on the idea that the knowledge acquired by the student and become part of its mental structure, triggering a range of mental processes such as understanding, interpretation and analysis. However, the information available in all sources that provided the student with that knowledge is simple and ordinary material that can be used only after processing, tabulation and auditing. and then associate it with the like, and classify it in the student's memory so that the student becomes a consumer of the information into a producer and contributor to employ it in a new situation (Sarab, 2023:74) These models are based on a study, analysis, depth and breadth of three main models:

- ❖ The progressive survey model that is oriented towards knowledge discovery and identification.
- ❖ Deep research model aimed at acquiring and building knowledge.
- ❖ Deep and structured Inclusive Learning Model for Knowledge Acquisition and Building

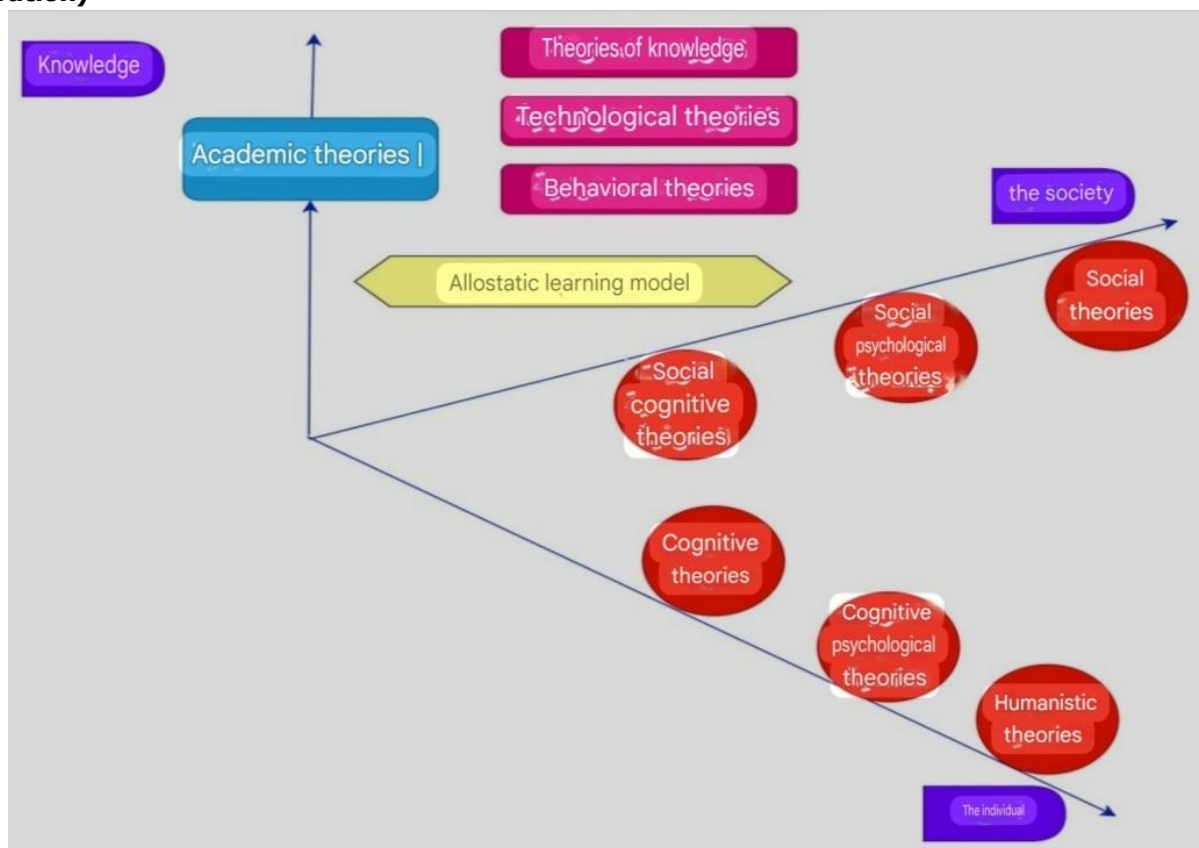
These three models contribute to the organization of knowledge handling activities in order to acquire and master their focus and training on a range of knowledge processes such as research, investigation, extrapolation, reasoning, conclusion, question generation, summarization, problem solving, etc., and these processes play an active role in deepening knowledge acquisition and acquisition, contributing significantly to the assimilation and use of information in multiple situations. (Alwan Et.Al, 2023:57)

Second: Interactive learning:

(Giordn Andre) is the founder of the Speculative Learning Model where he analyzed different learning theories and then organized these theories in the form of three axes or factors, namely: Knowledge, society, and the individual, found that most of the current theories are very close to one of those three components, that is, they focus on only one factor, while Jordan designed the speculative learning model at the point of convergence of several factors as an attempt to fill this gap and integrate the three factors (Benedict, 2020:79).

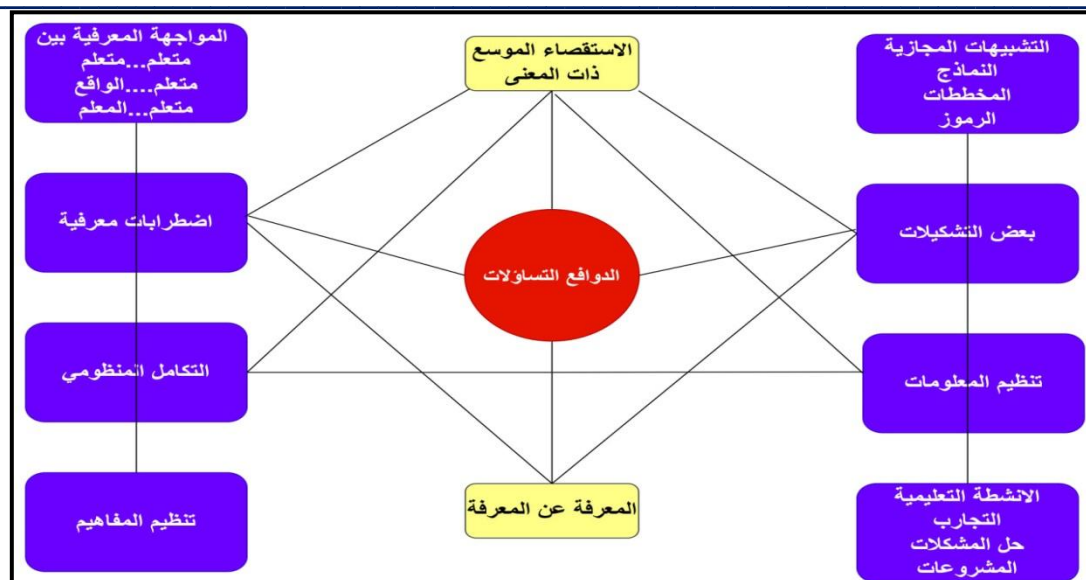
Research on learning is currently converging in the direction of many key outcomes. It highlights in particular the limits of both traditional educational practices and many innovations. and studies indicate that even when teachers cover the entire curriculum they do not necessarily communicate with students, New concepts and modalities of thinking cannot be learned from the direct transfer between teacher and student Before dealing with a subject in the classroom, each student has many questions, ideas and references (which relate to this subject) that must be taken into account. In other words, it deals with a particular type of interpretation called the concept (context). Concepts shape the way all students decode information. Knowledge building depends on the concepts prepared (the organization) through which students interpret the data they receive and are likely to develop new knowledge And every time the model is understood, the student's mental structure is completely reorganized Therefore, learning is not the result of simple transfers, for one-way channels from teacher to student that are commonly observed, The following chart shows the location of the speculative learning model for different learning theories (King, 2019:48).

Blueprint (1): Location of Speculative Learning Model for Different Learning Theories (Researcher's Preparation)



Phases of the complimentary learning model:

1. **Problem phase:** The teacher begins by asking students a set of questions. These questions may be quite clear to them, and may be less clear, but it is important that these questions relate to a particular concept or one of its applications. These questions are the driving force of every student's mental activity.
2. **Reference stage:** In order for students to answer a teacher's questions, they begin to try to create a relationship between the previous knowledge they possess and the new knowledge.
3. **Mental processes:** a set of all intellectual processes undertaken by students while participating in problem-solving activities and expanded survey activities. At this stage, students express the relationships between new and past knowledge through (fees, schemes, symbols).
4. **Semantic Network:** The interactive knowledge system that arises from mental processes based on past knowledge. This system gives comprehensive semantic coherence to the new concept and thus becomes easy to apply in many situations, i.e. the system arises as a result of the interaction of all the relationships formed between the main and sub-elements of the concept. This process produces a network of meanings.
5. **Connotations:** a set of ideas and symbols needed to express the concept and associated interpretations. (Richard, 2020: 21)



Blueprint (2): Phases of the Spectacular Learning Model (Researcher's Preparation)

Fourth: Scientific concepts:

Scientific concepts are the fundamental pillar of knowledge building, and at present their importance has increased remarkably due to the explosion of knowledge and the multiplicity and diversity of their branches. This rise in importance is attributable to the difficulty of understanding and interacting with different aspects of knowledge in the present era and therefore the primary concern of the teacher is to help students understand and understand the structure of basic concepts and logics of educational materials. Concepts are characterized by the facts as deep and multidimensional aspects of knowledge. concepts ", whereas facts are merely components or details consisting of concepts and therefore, Concepts can be said to be the overarching combination of various facts and information on a particular topic. and scientific concepts today are no longer just an aspect of learning, They are a fundamental focus of many school curricula, and the definitions of scientific concepts are logically multiple. The concept is seen as a set of common characteristics and features that distinguish the range of objects, incidents and symbols from other groups. Many definitions describe the concept as similar in substance. Because the concept is not just names, words, terms or symbols formed in memory storage These systems have undergone a number of mental processes, the most important of which is discrimination and generalization until the last stage at which it can be given a given name or symbol, This process cannot happen without students' past experience. biological concept is not much different from the definition of the concept in general (Al-Saabri, 2021:63).

Previous studies:

Gürbüztürk Study, 2016): The Impact of Using a Speculative Learning Model in Developing Problem Solving Skills When Teaching Seventh Grade Students English Language Courses

The study was conducted in Turkey and aimed at knowing the impact of the use of the part-time learning model on the development of problem-solving skills when seventh graders taught English courses. The study group consisted of 70 students, divided into two experimental groups, reaching 35 students, studied using the template for full-time learning, and 35 students. The study used a measure of problem-solving skills. The results of the study showed a statistically significant difference for the pilot group's students as a result of the use of the template for full-time learning. The results of the qualitative analysis of students' responses also showed their preference for using the offshore learning model because of the centrality of learning activities in the model around the student, as well as the relevance of the activities to their level and their ability to participate effectively during their implementation, which helped them to solve the problems they directed, which led to the development of their problem-solving skills.

Chapter III

Research curriculum and procedures

First: Research methodology: The researcher relied on the two methodologies (descriptive and experimental) because they fit the nature of his research based on the descriptive curriculum in building the proposed strategy based on inclusive learning, Because the descriptive curriculum in fact is a survey focused on some of the educational phenomena as they exist on the ground of realism. diagnosis and detection, as well as identification of relationships between its components or between them and different educational, psychological or social phenomena The researcher will present a description of the procedures for building the proposed strategy in accordance with the explanatory learning:

Building the proposed strategy: In order to achieve the study's objective (the effectiveness of a proposed strategy based on inclusive learning in the acquisition of scientific concepts among middle-level students), the researcher relied on the descriptive approach in building the proposed strategy, following the following steps:

1. **Analysis phase:** This phase includes the following actions:

- A. **Pupil Characteristics Analysis:** The research sample is the middle second grade students in Qadisiyah Governorate High and Middle Day Schools ranging in age from 13 to 16 years, and students at this age stage.

- B. **Study Content Analysis:** From the researcher's reading of previous sources and studies, he found that this step is linked to a later step: the formulation of behavioral goals. The starting point of the content analysis is the educational objective, the well formulated educational goal is easy to analyze and the researcher can isolate the necessary elements from the unnecessary ones.
- C. **Target environment analysis:** includes knowledge of the target environment, which is the school chosen in a deliberate manner, where the teacher needs to know precisely the classroom environment in which the lesson will be carried out in terms of: (number of students, class size, availability of material capabilities and facilities, physical atmosphere of the class).
2. **Planning phase:** This phase includes the following steps:
- Read past literature and studies that have dealt with speculative learning.
 - Read previous studies on building different teaching strategies.
 - Read a number of books that are interested in teaching chemistry.
 - Read the pedagogical principles and applications of speculative learning.
 - Identifying the elements of the proposed strategy in accordance with the educational principles and applications of enlightenment learning.
 - Presentation of a teaching plan in accordance with the proposed strategy and incorporating the strategy steps to a group of experts and arbitrators to verify its validity.
 - Time limitation: The researcher has set a timetable for studying the topics planned for the experiment in the light of each topic of the chemistry book for the second middle grade.
3. **Implementation phase:** Includes:
- Defining general educational objectives:** the objectives to be achieved from the teaching of chemistry using the proposed strategy, and the objectives are the cornerstone of the learning process. The educational objective, a general objective, describes the final macro skills that the student is expected to demonstrate after the learning process.
 - Formulation of behavioural objectives:** The researcher (156) formulated a behavioral objective in the light of the general objectives and content of the course contained in the chemistry book to be taught for the academic year (2024 - 2025), which was distributed among subjects to be taught in the second semester.
 - Preparation of teaching plans:** The researcher has prepared various teaching plans for topics to be studied in the experiment in the light of the planned content and the objectives formulated. The researcher has presented two model plans, including to a group of arbitrators, and in the light of their observations and opinions, the researcher has made the necessary adjustments and is ready to implement them.

Second: Formulation of elements of the strategy:

The researcher identified elements of the proposed strategy as follows:

- Pre-teaching activities: raising students' motivation and tribal requirements.
- Modalities of submission of information: sequencing in the provision of information, the size of the module and the course's progress plan.
- Students' contributions include their contributions to strategy training.
- Methods and means of measurement: The test was to gain scientific concepts.
- Follow-up and enhancement methods: promotion, feedback for students.

Third: piloting the proposed strategy on a number of students:

It is called "preparatory calendar" and aims to determine the extent to which the student is willing to start learning new subjects, or know the level of his or her mental skills needed to apply teaching strategies, so try the proposed strategy on (10) students - not students of the research sample - to verify their ability to interact positively with the curriculum of the proposed strategy.

Pilot curriculum: The researcher has adopted the definition of effectiveness of the proposed strategy, because it is a scientific curriculum in which the parameters of practical methods are clearly articulated. The researcher has followed the following steps in the pilot curriculum:

First: Experimental design: The researcher relied on the design of the non-random selection control group, an experimental design with a control group with tribal and remote testing which is a partial adjustment design. The researcher found it suited to the conditions of his research, as shown in the following scheme

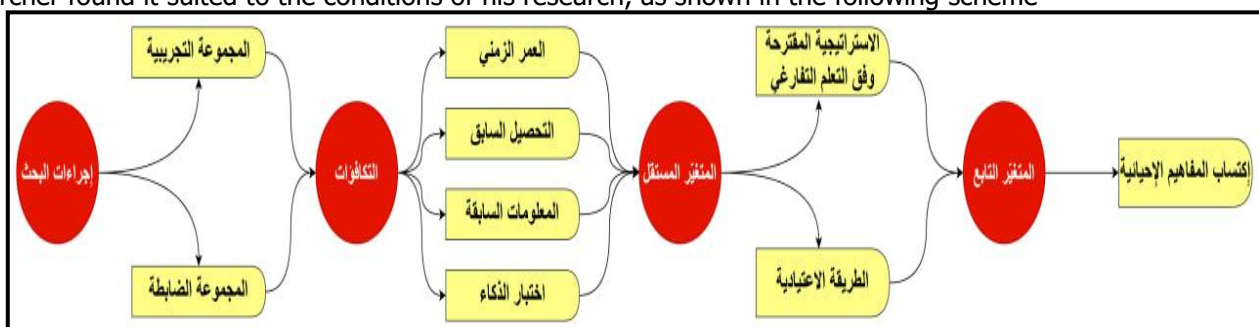


Chart (3): Experimental design of research (researcher's preparation)

Second: The research community and its sample

1. **Research Community:** The researcher identified the research community with middle second grade students in high schools and day mediums in Qadisiyah governorate.
2. **Sample search includes:**

A.School sample: The researcher used the intentional choice in selecting his research sample from schools. He chose the island medium for boys, from among the schools of the Directorate General of Education in Qadisiyah governorate.

B.Student Sample: The researcher visited - the middle of the island for boys - and found that it included two divisions for the second grade medium, and in the way of random withdrawal a division was selected (a) to represent the pilot group to study chemistry in the proposed strategy, while representing the Division (b) Control group that will study the same subject in the usual manner, and the number of students of the two divisions has reached 60 students (30) in Division (a) and (30) in Division (b).

Third: Parity of the two research groups: Before starting his experiment, the researcher made sure to equalize the two groups in a number of variables that may affect the results of the experiment, as per the following table:

Table (1) Parity of the two research groups in variables

Significance	T value		Degree	Deviation	Average	N.o	Group	Variable
	Tubular	Calculated						
Non significant	2.000	0.684	58	7.541	159.524	30	Experimental	chronological age
				7.463	158.969	30	Control	
Non significant	2.000	0.743	58	5.321	62.361	30	Experimental	Previous achievement
				5.021	61.976	30	Control	
Non significant	2.000	0.892	58	4.525	13.213	30	Experimental	Previous information
				4.346	12.547	30	Control	
Non significant	2.000	0.324	58	3.968	19.548	30	Experimental	I.Q test
				3.854	19.003	30	Control	

Fourth : Control of extraneous variables: The researcher tried to adjust a number of extraneous variables that he thought might affect the course of the experiment: (experimental breakdown, trial conditions and accompanying accidents, measurement instrument, selection of sample personnel, maturity processes, impact of experimental actions).

Fifth: Search tool:

Scientific Conceptual Acquisition Test:

1.Objective of the test: To assess the extent to which the students of the two research groups are able to acquire the scientific concepts included in the curriculum, which includes the school subjects in (Chapter I: Elements and Chemical Interdependence, Chapter II: Chemical Compounds, Chapter III: Chemical Formulas and Reactions), of the Chemistry Book for the Middle Second Grade, contained in the sixth revised edition of the academic year (2024 - 2025).

2.Identification of the number and type of test paragraphs: The researcher drafted the test for the acquisition of scientific concepts, based on the pre-defined concepts of 20 chemical concepts. In the light of the cognitive levels of the concept (definition, distinction, application), the test paragraphs (60) were a test paragraph of multiple choice. Four alternatives were given for each of the only one paragraphs representing the correct answer and three the wrong.

3.Test honesty: The researcher adopted two types of honesty:

- **Apparent honesty (veracity of arbitrators):** The researcher presented the test paragraphs in their initial form to a group of arbitrators. According to the instructions of the arbitrators, the researcher made the necessary adjustments. The ratio of agreement was between (83%) and more according to Cooper's equation of agreement. The results showed that all paragraphs were valid and appropriate for the intended purpose after the modifications of the researcher according to the views of the arbitrators.
- **Build sincerity (internal consistency):** Based on the researcher's analysis of the second sample scores used in statistical analysis, the construction was verified to test the acquisition of scientific concepts. This was done by calculating the correlation coefficients between the degree of each paragraph and the overall degree of testing, using the Point Biserial correlation coefficient, and the correlation coefficients ranged from 0.33 to 0.59, showing that all the paragraphs were statistically significant. Based on these results, all 60 test paragraphs were retained.

4.Drafting test instructions: Include:

- **Drafting Answer Instructions:** The researcher prepared the instructions for answering the test paragraphs for the acquisition of scientific concepts, so as to be clear and easy and include instructions for writing the student's information and determining the exam time.
- **Drafting test correction instructions:** For the purpose of correcting students' answers about the test paragraphs for the acquisition of scientific concepts, the researcher prepared the patch key for the typical answer, gave one score for the paragraph whose answer is correct, zero for the paragraph whose answer is wrong, i.e. the full degree of the test became (60) and the lowest score for the test is (0).

5. Application of test to reconnaissance sample:

- **Survey Sample I:** The researcher applied the test to a sample of middle second graders. He noted that the instructions for the answer were clear, through the lack of questions posed by students about the answer. The time of the answer to the test was calculated by finding the average time taken by all students of the first survey sample, which represented (40 minutes) is the total test time.

Second reconnaissance sample: After the researcher ascertained the clarity of the test paragraphs, instructions and time needed to answer, and to extract the test's own psychometric properties, the researcher applied the test to a second reconnaissance sample, similar to the research sample of 100 students, to extract the psychometric properties:

- **Difficulty factor and ease of paragraphs:** The difficulty factor for each test paragraph has been calculated using the difficulty factor, if the difficulty factor for paragraphs ranges from 0.361 to 0.675 and all are acceptable
- **Paragraph differentiation factor:** calculated a differentiation factor for each paragraph in the acquisition test, and was found to range from 0.343 to 0.596, all of which were acceptable.
- **Effectiveness of erroneous alternatives.** The effectiveness of substitutes for the paragraphs was calculated after their adjustment had been applied and was found to range from 0.034/0.259, indicating that the erroneous alternatives attracted the largest number of lower group students than the upper group.

6. Test Stability: The Halfway Method was used to extract the stability of the scientific conceptual acquisition test if the value of the Pearson correlation coefficient (0.897) and the correction equation by the Spearman Brown correlation coefficient (0.936).

7. The final test for the acquisition of scientific concepts: after the test was ready and completed by statistical procedures, the researcher applied the test to the two research groups consisting of 60 test paragraphs and each paragraph had four valid alternatives and three wrong alternatives.

Sixth Statistical Means: The researcher used the SPSS Social Science Statistical Pouch Program to analyze and interpret his data.

Chapter IV

Presentation and interpretation of results

First: Presentation of results:

The zero hypothesis states that (there is no statistically significant difference at 0.05) between the average grades of experimental group students who will study chemistry according to the proposed strategy and the average scores of control group students who will study the same subject in the scientific conceptual acquisition test prepared for this research).

To verify the validity of the previous hypothesis, the researcher extracted the computational average, variability and standard deviation of the students of the two research groups, showing that the average scores of the experimental group studied according to the proposed strategy according to the speculative learning. (33.356) that the variation reached (27.175), the standard deviation reached (5.213), and that the average grades of control group students studied in the usual way were (28.251), the variance was 27.102, the standard deviation was 5.206, and when using the T test (t - test) for two independent samples, the statistical results showed a statistically different D, that the calculated T value (4.696) was greater than the tabular value (2,000) at an indicative level (0.05) and a degree of freedom (58), and table (2) and chart (4) show this:

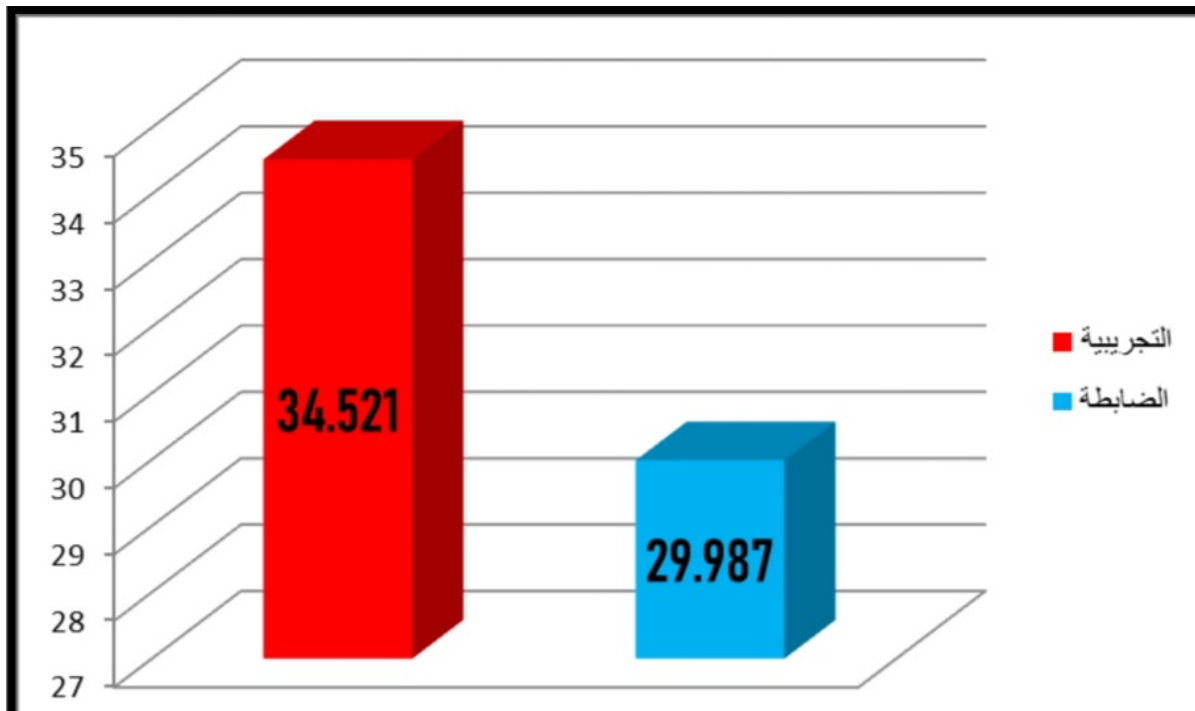
Table (2) Computational average, variability, standard deviation and T value of the grades of the students of the two research groups in the final scientific conceptual acquisition test

Significance	T.value		Degree of freedom	Standard deviation	Variation	Arithmetic Average	N.o	Groups
	Tabular	Calculated						
Statistically significant	2.000	4.696	58	5.213	27.175	33.356	30	Experimental
				5.206	27.102	28.251	30	Control

(4) Average computational chart of students' grades of the two research groups in the final scientific conceptual acquisition test

From the previous table and chart, there is a statistically significant difference between the average grades of the two research groups' students in the scientific conceptual acquisition test and for the benefit of the experimental group This result demonstrates the superiority of the students of the experimental group who have studied according to the proposed strategy on the basis of full-time learning to the students of the control group who have studied according to the usual method of acquiring scientific concepts and thus rejects the zero hypothesis and accepts the alternative hypothesis that: (There is a statistically significant difference at 0.05 between the average grades of pilot group students who will study chemistry according to the proposed strategy and the average grades of control group students who will study the same subject in the scientific conceptual acquisition test prepared for this research.)

To ensure that this difference is the result of the impact of the independent variable on the dependent variable and did not occur as a result of chance, the researcher calculated the size of the effect by the Cohen box and then calculated the value of the detection of the degree of impact where the Cohen box was valued (0.98). This indicates a significant



impact on the test for the acquisition of scientific concepts according to the standards established by Cohen and the following table:

Table (3) Impact Size of Independent Variable in Scientific Conceptual Acquisition Variable

Volume of impact	Value of impact size	Dependent variable	Independent Variable
Large	0.98	Acquisition of scientific concepts	Proposed Strategy on the Basis of Inclusive Learning

Table (3) above shows that the value (d) of impact volume is 0.98, which is appropriate for the interpretation of impact size and an average of the proposed strategic teaching variable on the basis of onward learning in the acquisition of scientific concepts and for the benefit of the experimental group.

Second: Interpretation of results:

The result indicated a statistically significant difference between the average grades of the experimental group students who studied chemistry in the proposed strategy on the basis of full-time learning, and the average grades of the control group students who studied the same subject in the usual way in the changing acquisition of scientific concepts for the students of the experimental group. In the researcher's view, this is due to:

- 1- The proposed strategic steps on the basis of full-time learning and their implementation have helped students analyze the problem they face in an analytical manner and develop reasons for the problem to reach satisfactory outcomes. This has made it easy to teach students and make them interact with the length of the class time.
- 2- This strategy enhanced students' participation in the discussion of ideas by dividing students into groups, leading to an exchange of ideas among all students, thus opening the way for them to understand the subject in depth.

Third: Conclusions:

- 1- The proposed learning strategy plays a role in the teacher's management of the class by engaging and exchanging views between students and overcoming the boredom and inertia of students compared to the usual bored method within the class.
- 2- The proposed strategy has contributed to the promotion of students' freedom of ray and exploration, analysis, questioning, raising and positive participation during the course of the lesson.

Fourth: Recommendations:

- 1- The Directorate of Education should organize training courses and teaching programmes for teachers of chemistry for the purpose of providing them with modern strategies in a general way and with a strategy proposed on the basis of specially educated learning, as well as providing schools with modern methods because the usual method has become useless.

2- The chemistry teacher should introduce the cooperative group system as a system that makes the student a fan of the lesson participating and effective. The student receives information from his peers and the teacher, thus making the learning clear.

Fifth: Proposals:

1- Undertake a similar study using the proposed strategy based on speculative learning in other variables of thinking types and acquire scientific concepts.

2- Conduct a study to determine the effectiveness of the proposed strategy in accordance with full-time learning in different subjects and other stages of study (physics, biology).

Sources

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