



Eximia Journal
(ISSN 2784-0735)

Vol. 13

2024

The Effect of Neal's model on the Deep Understanding Of The Students Of The Third Intermediate Grade in Chemistry

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Abstract. The research aimed to find out the impact of Neel's model on the deep understanding of the third intermediate grade students in chemistry, and an experimental design with partial control (comprised of an experimental group and a control group) was chosen. Thirty-three (33) of them were pupils from the same grade at Al-Riyadh High School for Baghdad Al-Karkh General Directorate of Education / 3 for the collegiate year (2022-2023 AD) The study sample was rewarded with the following: (intelligence, chronological age in months, previous knowledge, and deep understanding), and the researcher relied on the deep understanding test tool, and its validity and stability we discovered, and the scientific material was chosen and prepared in the form of plans (for both groups) for The research sample was used, and it was statistically analyzed using the software program Statistics. The data were then interpreted by the researcher, who then presented many directives and some ideas.

Keywords. Effect of Neal's model, student, chemistry

Research issue:

The world is witnessing progress and development in various fields of science, and this progress has been accompanied by a large and rapid knowledge explosion, and man has become in need to adapt to this scientific progress, and to participate in life in a positive way to be able to keep up with this huge amount of information, and it has become necessary to work Diligently and systematically understanding to choose the best solutions that push society forward and catch up with progress, so it was necessary to teach our students how to think and understand, not how to memorize academic concepts without understanding, comprehending or applying, so it is the duty of educators to keep up with this huge torrent of information from Through an educational environment based on modern teaching methods and models (Al-Anbaki, 2014: 71). The researcher then examined a number of papers and researches that addressed the issue of middle school kids' inadequate learning of chemical ideas or their lack of deep comprehension, such as the study (Al-Masoudi, 2002), which indicated that students had difficulty learning chemical concepts and depended on the deaf to memorize the material. And then they do not retain the chemical concepts, which negatively affects their achievement, and the reason for this is due to the adoption of the usual teaching methods, in addition to the

shortage of laboratories, and if they exist, they lack the necessary equipment and tools, and the study confirmed (Al-Dayea, 2018). Most middle school students suffer from a weakness in acquiring chemical concepts and thus their deep understanding of them, and she attributed the reason to the fact that most teachers rely on the usual methods of teaching chemistry, which do not activate the role of students and focus on memorization and indoctrination (Daye', 149: 2018).

Therefore, The issue is best described as follows: What is the effect of Neal's model on the deep understanding of third-grade intermediate students in chemistry?

The importance of research:

Teaching science represents a high place in the academic program for students, as it aims at acquiring scientific knowledge, developing a deep understanding in them, and developing scientific trends and inclinations, and seeks to form and develop appropriate scientific skills for them through its scientific activities and laboratory experiments, and chemistry is one of the subjects Basic science in the intermediate stage, through which it is possible to search for an explanation of natural and abnormal phenomena in a way that based on experience and is supported by mathematical laws in order to characterize a phenomenon and make an effort to use it to our advantage. (Zaitoun, 2005: 17-24).

Attention must be given to the basic pillar that corresponds to the content of the pillars of the educational process represented by modern teaching models and methods through its effectiveness in translating the content of the material into a social scientific educational performance, as it contributes to the growth of their personality and the development of their intellectual and social skills (Al-Khawaldeh et al., 1997: 7), As the teaching models that are appropriate to the content have a great impact on achieving the objectives of the subject, and the teaching models differ according to the different materials, subjects, and the teaching environment (Al-Khazraji, 2011, 16), and therefore the interest of educators has become to search for the best models in which chemistry is taught, and the method of teaching it is one of The means of developing science today (Nashwan: 12, 1989). In addition to the fact that the usual methods may not play a role in absorbing knowledge and increasing the criticism directed at it, the search for a new and developed model for teaching science in general and chemistry in particular is a matter of utmost necessity. Accordingly, a number of educators have developed models and strategies emanating from cognitive learning and learning theories. Behavioral for a number of researchers in order to help students learn (Qatami, 1998: 7). (Al-Huwaidi, 2005) emphasizes the importance of using modern teaching models represented in placing students in the first place among the elements of the educational process in order to acquire sound concepts and how to expand their deep understanding, as well as in order to prepare them and participate effectively in civic life and to be productive or learners throughout their lives (Al-Huwaidi 2005:49). Among the best specialized models in teaching are those that motivate students to self-reflection, develop in them self-confidence, and accustom them to the methods and methods of learning and research (Nasser, 1989: 93). It also helps students to successfully manage the educational situation, develop their behaviors, attitudes, and attitudes, and improve and activate their ideas through working in groups, raising their academic achievement, increasing their deep understanding, and achieving educational and cooperative goals (Marzouk, 2009: 12). Among the modern educational models that emerged from the constructivist theory is the (Neale) model, This is regarded as one of the contemporary models for teaching in the educational process (Al- Khalili et al., 1996: 248).

The designer of The advanced organizations theory of purposeful learning, It was used to benefit the model and is characterized by having an introductory introduction at the level of generality, abstraction, and comprehensiveness of the instructional material. (Yassin, 1999: 33).

The (Neale) model's significance lies in the organized and logical progression of steps that support the development of concepts and their proper acquisition. It also fosters students' communication skills through discussion and conversation, gives opportunity for them to form strong bonds with the school and develops students to gain a deep understanding of various learning scenarios as well as Exercise your brain processes. By completing tasks, exercises, and other assignments, they improve their capacity for thought and capabilities. (Muslim, 117: 2015). And that the (Neale) model focuses on presenting opinions and ideas freely and is concerned with accepting, discussing and strengthening the opinions presented by students during the educational processes through dialogue, discussion, criticism and analysis, which automatically raises them to increase self-confidence and appreciation for their learning. It also helps to develop and choose scientific concepts among students, which is one of The crucial objectives of the educational process and the acquisition of time management skills and dialogue with others. Deep understanding is one of the skills that enter the stages of the creative process, which begins with the stage of mental preparation, then with the interest that leads to the formation of the individual's motivation to research, investigate and scrutinize a problem in order to reach a deep understanding of it in all its aspects, then the incubation stage, after the understanding process. This is followed by the stage of mental enlightenment, which is the moment when he says to the Creator, "I found it," and it becomes clear to him what is mysterious, which is the stage of solving the problem or clarifying the situation after a deep understanding of it. Which leads him to satisfaction and psychological cognitive balance after the anxiety he experienced in the incubation stage, followed by the last stage, which is to verify the results he reached through practical experience (Al-Hailat, 2015: 30-31). Consequently, the following points make clear how important the research is:

1. Staying up to date with scientific advancements, scientific openness, and its effects on education.
2. Including some concepts and strategies for teaching chemistry at the intermediate level while utilizing the (Neale) educational model as a cutting-edge method of instruction.
3. This study might help male and female teachers alike recognize the value of the (Neale) model when teaching chemistry.
4. current research presents a test of deep understanding, which benefits researchers in conducting research in this field.

Search goal:

Statement of the learning effects on the third-grade pupils' in-depth comprehension of intermediate chemistry using Neale's methodology.

Speculation (research) The researcher makes the following assumption in order to fulfill the purpose of the study:

pupils in the experimental group (first), who received instruction based on Nell's model, and pupils in the control group (second), whose results were averaged, who were instructed using the standard deep understanding techniques, did not differ significantly at the level of significance (0.05)..

Search limits:

1. Human Limits: Third-grade intermediate students in one of Baghdad's top classes in the morning.

2. Geographical boundaries: Baghdad, Karkh, and the General Directorate of Education.

3. The academic year (2022-2023) serves as a temporary limit.

4. Limitations on cognition: Chemistry textbook for third-grade intermediate students (for the corresponding academic year's updated curriculum). Al-Dujaili, Ammar Hani, and others, Fourth Edition, General Directorate of Curriculum, Ministry of Education, Republic of Iraq, Baghdad.

Define terms:

Effect: Known by:

A (Al-Shuwaish, 2012) defining it: "The result of something and the result that is based on it" (Al-Shuwaish, 2012: 90)

b) (Al-Kubaisi, 2012) that: "The expected result will appear on the students' thinking and behavior, as an educational and thinking outcome after subjecting them to programs or studying an educational subject" (Al-Kubaisi, 2012: 13).

The researcher adopted the definition (Al-Kubaisi, 2012) theoretically.

The researcher defines it procedurally: The degree to which teaching with the Nell model has changed or affected the third and intermediate grade pupils' depth of comprehension.

2- (Neale) model defined by:

A) (Nussbaum and Sinatra, 2003) as: "a cognitive educational model, developed by (Neale) and others, for arranging the teaching of concepts, and it includes eight steps: presenting the learning topic, reviewing, the focus of the lesson topic, developing lessons, investigation and activities, representation, discussion and summarization or shut down." Nussbaum and Sinatra, 2003: 535).

b) (Abu Riash, 2007) as: "an educational model that indicates how to apply the learned knowledge in new situations or different learning environments." (Abu Riash, 2007: 55)

Theoretically, the researcher adopted (Abu Riash, 2007)'s definition.

The model is the one used to instruct experimental group third-grade intermediate students, and according to the researcher, Direct instruction, review, investigation-related activities, contrast and expression, discourse and discussion, innovation, application, and summation or closing are its nine steps.

3- Deep Understanding: Defined by:

a. (Lutfallah, 2006) that: "This type of understanding makes the student able to practice generative thinking skills, make appropriate decisions, give appropriate explanations, and ask fundamental questions on multiple levels" (Lutfallah, 2006:108).

B. (Al-Otaibi, 2006) that it is: "a set of mental processes that students employ to understand the content of a particular curriculum, as it is based on explanation, clarification, interpretation, application, and perspective taking" (Al-Otaibi, 12: 2016).

The researcher adopted (Al-Otaibi, 2006) a theoretical definition of deep understanding.

It defines it procedurally: it is the student's ability to think and link between the information presented and the previous information in a logical framework in chemistry that requires them to practice generative thinking skills (the skill of developing hypotheses, forecasting in developing data, recognizing fallacies, skill of flexibility, decision-making skills, interpretation skills, and the skill of asking questions) Tand is determined by the grade that pupils will earn on the exam created with this aim in mind.

The philosophical aspect:

Teaching models are models that are based on educational psychological theories, and (Joyce Doyle) assumes that the model is a plan that can be used in organizing the work of the teacher and his tasks of educational and teaching materials and experiences.

The model is generally defined as a way of thinking that allows for integration between theory and practice. It is a schematic representation in which events, processes, and procedures are inhabited in a logical manner that is understandable and interpretable (Al-Adwan and Muhammad, 2010: 163). As for the components of the teaching model, there is agreement among most educators on the basic components on The teaching model is as follows:

Title: It is required that it be clear and specific to the basic idea of the form and be suitable for the age group of the student.

Justification: It aims to excite students and encourage them to read, and gives a general idea of the subject of the model and what is required of them.

- Objectives: to be brief, explaining the expected behavior after completing the lesson, and clear, commensurate with the number of general goals to behavior in each model.

Activities: The model is planned to enable students to learn through a set of activities that seek to achieve the intended goals.

- Evaluation: It includes how to measure the extent to which goals are achieved and to form objective evaluation questions in correction (Mahmoud, 2004: 284-285).

Neale's model:

The scientist (Neale) and several of his colleagues came up with this model in 1978. The concepts found in advanced organizations, concept maps, and the learning cycle served as the foundation for this approach. The focus of direct education is on the teacher's attention transferring from the pupils to the learning objectives. and the teacher speaks about the subject, for example, by presenting basic information that is helpful to students and that they cannot access in any other way, and piques their interest and motivation towards learning, as well as helping them master the information needed for additional study and activity preparation, including the laws, regulations, and practices. previous knowledge, reminding students scientific principles and regulations, and instructing them on how to carry out the necessary work and draw scientific conclusions, (Al-Khalili et al., 1996: 248).

Using the Neale model is contains several phases.

This methodology has nine steps via which the lesson is delivered, including: - Direct education, where the teacher starts by providing a basic overview of the course's goals, topics, and activities.

Revision: At this level, earlier lessons that are pertinent to the new lesson are discussed to help students understand its developments and concepts.

- assessment: At this point, the fresh data or the problem that will be presented is given a broad and preliminary assessment. During which this occurs mentally by reshaping these plans by modifying them and using new ones, students' For them, inspiration or brainstorming occurs for clarity, explanation, and what is required in order to fit the current cognitive Tables they have that are relevant in understanding the phenomenon or problem required to learn from.- Investigation - **Activities:** At this stage, the student engages in a number of experimental activities to learn about the components, tools, and all the equipment which they must comply perform manual labor. At this point, the teacher asks questions and provides guidance to help students test their theories while also assisting them in achieving their objectives. Required.

Clarification and expression: At this step, students respond to the teacher's queries with the outcomes of their activity. With the use of tables, drawings, and idea maps, students will be

able to convey what they have learned while becoming accustomed to communicating with others.

- Dialogue and discussion: At this stage, students are talking about the outcomes of an activity they just completed. In this phase, the instructor poses a series of queries like, "What did you find? What took place to you? How did you act? What support do you have for this claim?"

- Direct teaching (invention): At this point, the teacher engages in direct teaching once more as both new ideas and their explanations are taught. As he describes what transpired to them, reading the book's content also happens. In terms of misunderstanding or attempts to amend the understanding. This step is done to develop students' not to memorize the knowledge, but to grasp what has been learnt of new information on the subject of the lesson..

- Application: The goal of this stage is to broaden the student's understanding and assist him in solving issues and responding to questions that have not yet been posed to him. The new knowledge is tested in different contexts.

Finalizing and summarizing The lesson's outcomes, extensive concepts, summaries, and interpretations that were dealt with during the knowledge structure's organizing stage as well as the conclusions reached during the application steps are all presented in an overall summary during this step. The lecture and a kind farewell to the pupils (Al-Khalili et al., 1996: 485-486).

Features of the model (Neale):

The Neale model is one of the constructivist teaching models that depends on meaningful learning, among other things.. (Yassin, 1999) indicated a number of characteristics, and the researcher extracted the following from them:

The Neale model focuses on strengthening scientific reasoning abilities, fundamental scientific concepts, such as observation, prediction, and measurement, as well as complementarity, such as changeable interpretation and control.

- Aids students in gathering and developing knowledge through exploration and involvement in group projects.

- helps students develop a variety of intelligences, such as logical and mathematical intelligence through the stages of clarification and expression, the use of tables and calculations, interactive intelligence through social interaction, and natural intelligence through the use of tools during the investigative stage.

- The most important thing that the model does is attract attention and stimulate motivation through the way the activities are presented.

- The use of initiatives and tools to promote education can be flexible. The description, interpretation, and discussion of the model in a consistent manner allow students to learn in a constructive way, which is what constructivism aims for.

(Yassin, 1999: 35).

Deep understanding

Understanding is the foundation upon which teaching is built. For understanding, we find that it is a curve of curricula, teaching, and assessment designed to get students involved in performance tasks to enhance the transmission of learning impact, provide a framework that helps students understand concepts, skills, and facts that are out of context, and uncover and consider the learner the main important ideas present in the educational content. It is a center of activity characterized by the ability to link ideas, generate new ideas, and apply the knowledge and skills acquired in unfamiliar situations and contexts. (Mintzes et al.. 2005: 77)

Therefore, teaching strategies for understanding focus on the process of generating and giving meaning to what is learned by evoking experiences and representations that are stored and processed to receive new representations in a lively and active way in which the learner participates in subtraction and clarification, and generating questions and ideas in a way that contributes to the production of new knowledge (Qatami and Amour, 115 : 2005).

Perkins (1993) noted in his book *Teaching for Understanding* that schools need to be taught for a deeper understanding and active use of knowledge as part of the learning process, and in order to achieve this understanding, they must design tasks that require reflection on relevant topics and design. These tasks are in the form of presentations that lead to understanding. (Perkins) described the quality of these tasks as far from the usual stereotypes (Jaber, 2003: 255).

Dimensions of deep understanding:

Jaber (2003) collected six dimensions of deep understanding:

a. Explanation: It means the use of dialogue or interaction within the classroom so that we make students explain or justify their responses through the teacher's design of ideas, tasks and questions that are at the heart of the matter, and understanding applications must require deep thinking responses in the sense that they explain to the student how things work and what are their effects. With providing justification for the reasons that led to this based on the theory that prompted him to understand and summarizing it with (how and why)

B. Interpretation: It includes an in-depth understanding of the meaning of texts, events and data. The process of constructing meanings and possessing explanatory capabilities for the learned materials enables students to build independent mental habits to reach an advanced stage of knowledge.

T. Application: It is the correct use of ideas, processes and knowledge effectively in new situations, and that the student is able to use the various knowledge related to the educational situation in new situations and different contexts.

w. Perspective: It requires students to answer a question, what is the importance of that, which is realizing the importance or insignificance of an idea that is available for understanding, which requires possessing the ability to critical views and clairvoyance, and this means that looking at problems and solving them from a different angle, which contributes to the development of habits Distinguished and correct mindset, revealing critical spaces for their ideas other than the ideas presented, and understanding the perspectives behind the teacher's opinions and views of the specific content.

c. Emotional empathy: It is represented in the student's ability to put himself in the place of others and give up his reactions in order to understand the reactions of others and try to reach inside the feelings of another student and his view of the world in an attempt to feel as others feel, and this is what is called the intellectual mental imagination that is The basis of understanding to help diversify ideas.

h. Self-Knowledge: Students are asked to write a self-evaluation describing their sense of progress in understanding and knowing the limits of their understanding? What does the student not understand? It requires the teacher to use the strategy of repetition of questions and the development of thinking so that the student gets involved in metacognitive thinking and realizes his strengths and weaknesses, and this is one of the most important mental habits that must be developed for the student (Jaber, 2003: 347_366).

Davis et al. identified aspects of deep understanding:

A. the explanation.

- b. interpretation.
- T. application.
- w. analysis.
- c. installation.
- h. Problem Solving.
- x. Connect information.

Deep comprehension skills:

Deep understanding requires the following abilities:

An example of generative thinking is (fluency of meanings and ideas, flexibility, hypothesis and prediction in light of the available evidence, expansion, inference).

B. Decision-making: This involves selecting the best course of action in a given circumstance and providing support for your decision.

T. Interpretation ability: The capacity to explain and understand scientific observations and offer context to outcomes or relationships. This interpretation may change based on prior knowledge or the specifics of the topic at hand.

Asking a variety of questions at various levels, such as inquiries that touch on Bloom's six cognitive levels (remembering, comprehending, applying, and analyzing) (Jaber, 2003: 357_359).

Research methodology and procedures:

Since The Neale's model is a separate factor in the current study and deep understanding is a dependent variable, a semi-experimental design with The experimental group is one of two equal groups. studying using the Neale model and the group under control studying conventionally—was chosen. The post-test for deep understanding and Table (1) were also included. He explains it below..

Table 1 shows how the study's experiments were conducted.

dependent element	the unrelated factor	parity	the group
Deep understanding	Neale's model	– intelligence	Experimental
	the usual way	– Chronological age in months	control
	– previous information		
	– Deep understanding		

Identify the sample and the community:

Study participants: The community for the study included every third-grade intermediate student enrolled in public secondary schools under the Education Directorate of Baghdad-Karkh/Third for the collegiate year (2022-2023).

Example: The researcher purposefully selected (Al-Riyadah High School for Exceptional Students) to apply the results of the current study.

Verifying Internal elements of the experimental plan consistency: The following are some of the ways the researcher tried to limit or detect extraneous influences that might have impacted the experiment's outcomes::

First: Equivalence for the two groups:

1- Chronological age in months:

For the people in the first and second groups according to chronological age standard deviation and the mathematical mean were determined. The mathematical mean of the participants in the experimental group looked to be (187.09) with a value of (s (5.738), and the mathematical mean of the participants in the oversight group appeared to be (187.58) with a value of (s (3.792). It was discovered that the t-value obtained is (0.469), it falls short of the conventional t-value (2,000), and degrees of freedom (64), using the (t) test to ascertain the distinction between two independent samples. This indicates that the chronological ages of the two groups are comparable. Table 2 demonstrates that.

Table 2 shows the pupils in the study sample's t-value, standard deviation, and the mathematical mean for their chronological age in months.

The meaning of the difference	degree of freedom df	significance level	T value)t (standard deviation)S (Arithmetic mean x	The number of the sample	the group	variable
			Tabular	calculated					
Not statistically significant	64	0.05	2	0.469	5.73	187.09	33	Experimental	the age temporal
					3,792	187.58	33	control	

-IQ test :

In the (60-item) intelligence selection of (Raven), the mathematical median and range of the participants in calculated for the first and second groups. The arithmetic mean of the scores for the control group was 36.45 with a standard deviation of 6.965, whereas the mean scores for the experimental group were 38.78 with a standard deviation of 7.142. The difference's importance It was discovered that the t-test (t-test) value (1.330), which is lower than the t-value in the table (2,000) at the degrees of freedom and significance level (0.05) (64), indicates the two groups are comparable in terms of intelligence levels. According to Table (3), between.

Table 3: The value, standard deviation, and arithmetic mean.

The meaning of the difference	degree of freedom df	significance level	t _ value		The standard deviations	SMA _ x	The number of the sample	the group	variable
			Tabular	calculated					
Statistically Girdal	46	0.05	2	1,330	7,142	38.78	33	Experimental	intelligence
					965.	36.45	33	control	

Test for the equivalence of prior knowledge:

The first and second groups' members' arithmetic means and standard deviations were computed from the prior knowledge scores. It was discovered that the arithmetic means of the two groups were, respectively, 22.937 with a standard deviation of (3.5097) for the experimental group and (2.5610) for the control group, respectively. The significance of the difference was assessed using the t-test on two independent samples, and the results show that the two groups are equal because the calculated value (t-test) is (0.715), which is lower than the tabular (t-test) values

(2), at a level of significance (0.05), and degrees of freedom (64).. Table (4) from earlier information grades

Table (4)

the prior data's Standard deviation, value, and mathematic mean (t-test).

The meaning of the difference	degree of freedom df	significance level	t value		The standard deviations	SMA \bar{x}	The number of the sample	the group	variable
			Tabular	calculated					
Not statistically significant	64	0.05	2	0.715	3.5097	22,937	33	Experimental	previous information
					2.5610	22,393	33	control	

4- Deep comprehension test:

The deep understanding exam was used by the researcher, and its accuracy and dependability were confirmed. The median results and variation for study participants were discovered utilizing (t-exam) ,(0.05) and a degree of freedom (64), indicating that the deep understanding of the experimental and control research groups is identical and that there is no statistically significant difference between the deep understanding of the research sample's students.. similar to Table (5)

the t-test results for the deep understanding are shown in Table 5.

The meaning of the difference	degree of freedom df	significance level	t value		The standard deviations	SMA \bar{x}	The number of the sample	the group	variable
			Tabular	calculated					
Not statistically significant	64	0.05	2	1,188	4,534	10,275	33	Experimental	comprehension
					4,114	9,125	33	control	the deep

Controlling uncontrollable factors (internal security)

2- Duration: The experiment lasted for 20 weeks, covering the school year's first and second semesters (2022–2023). For both the T and D research groups), there were four weekly classes, and for the two groups ,(TandZ), there were two study sessions per week. The researcher was careful to make sure that the study materials provided for each study session were equal for the two research groups.

Since the experiment's beginning on 3/11/2022 AD until its conclusion on 12/4/2023 AD, there were two classes for each group.

3. The instructor: The researcher personally instructed the research sample's pupils in order to protect the experiment from being tainted by the students' reactions to the different teaching styles of the instructors.

4- Study guide: The two research teams used the Fourth Edition of the Third Intermediate Chemistry Book, 2016 AD, as their study guide.

4- Experimental extinction: the student phenomenon missing or interrupting working hours (the experiment); however, during the researcher's execution of there was no interruption,

abandonment, or transfer of any study sample during the trial. students occurred throughout the experiment.

producing study materials :

For the purpose of carrying out the research procedures, the current study requires the creation of a list of specifications, which include:

A.Choosing a scientific field of study:

During the academic year's research period, which lasts for two complete semesters. (2022-2023 AD), For the first and second research groups, the scientific content was chosen.This covered how to split classes based on academic content, how many pages each chapter should be, and how to adapt the material of the chemistry textbook for the third intermediate grade.

B. Develop behavioral goals:

In consideration of the scientific information provided in the material modified for the chemistry textbook for the third intermediate grade, the researcher developed (320) behavioral objectives. The researcher created (42) behavioral objectives in the cognitive component and offered the behavioral objectives to subject-matter specialists (levels of analysis, installation, and evaluation)..

T. planning lessons: Based on the material covered in the third intermediate stage of the chemistry curriculum, (40) study plans using the Neil model and (40) regular plans were created for the first and second groups, respectively.

The suitability of these plans for A panel of specialists in the teaching of chemistry discussed the teaching approach utilized with the two experimental groups and the control group, as well as their adequacy for the curriculum's content and performance goals..

Creating the study guide: creating the deep understanding testa. The researcher set up an exam paragraphs at the level of third intermediate students to measure deep understanding skills, after reviewing the chemistry book to be taught, some literature and previous studies related to this regard, and interviewing a group of experts in educational and psychological chemistry, measurement and evaluation, and in light of that, (20) paragraphs were formulated, In its initial form, all of which were of the four-option multiple-choice variety, one alternative is correct and the rest is wrong. The respondent gets one degree when choosing the alternative, and zero when choosing the wrong alternative, as the researcher discovered in it an appropriate tool for his research, he applied it to a sample of third intermediate students.

B. 1) Apparent honesty: In order to assess the validity of its paragraphs for the academic stage under study, the researcher had it presented before multiple arbitrators in its basic form with expertise in measurement, evaluation, and methods of teaching science. Based on the arbitrators' agreement, the percentage of paragraphs whose validity was endorsed by the arbitrators remained at (80%). even more, according to Cooper's equation of agreement, and some of the paragraphs indicated by experts and arbitrators have been modified, and thus the number of test paragraphs has been kept as it is.

2) The deep understanding test's initial experimental use:

The deep understanding a test was run on a sample of (30) students from the third intermediate grade on 11/3/2022 AD. In this procedure, the students' questions and observations about the answer paragraphs and instructions were recorded, and the time taken to answer all the test paragraphs was calculated.

3) The deep understanding test's second exploratory application:he a test was conducted on another survey model consisting of (100) students from the third grade on 6/11/2022 AD, and this was done under the researcher's own supervision. This was done after the initial survey sample underwent the exam, and the length of time needed to respond to its paragraphs, the

clarity of the instructions, etc., and the method of answering them were determined. To obtain stability with the electronic statistical software through the alpha-Cronbach equation, On the second exploratory sample, it was utilized.. The test was passed because the stability result was within (86%). As a result, the previous version of the deep understanding test was ready to be applied to the two research teams.

Experimenting with application methods : According to the following guidelines, The first and second research groups' students participated in the experiment.:

A- On (7–10–11/2022 AD,) the experiment was conducted by administering tests of intelligence, comprehension of complex ideas, and chemistry knowledge to the test-group and control-group.

B - The experiment for the two groups (experimental and control) started on June 11th, 2022 AD. the test-group and control-group the researcher's instructional strategies had created in accordance with the Neale model, While the experimental group followed the lesson plans that the researcher had developed for this reason, the control group studied as normal.T- The deep comprehension postgraduate test was utilized on.

Presentation and discussion of results

Results presentation: The researcher determined the Ttest results for the students' scores in the group (T and D) for deep knowledge in order to prove the hypothesis, as given in Table (6).

Table 6 shows the results of the Ttest to determine the significance of the variation in study sample averages between the pre- and post-deep understanding tests.

A LEVEL OF (0.05) STATISTICAL SIGNIFICANCE IS USED	tabular t-value	The calculated t value	degrees of freedom	variance	standard deviation	SMA	sample number	the group
statistically "significant"	2	4,580	64	11,868	444 .3	13,225	3 3	Experimental
				13,527	677 .3	9,575	3 3	female officer

Although the experimental group performed better than the control group, and the experimental group's average student score was higher. was (13.225) with a variance of (11.868) and the average score of students in the control group was (9.575) with a variance of (13.527). The two groups' scores were compared to see if the aforementioned theory held true. The calculated Ttest value was (4.580), which is greater than the standard Ttest value (2.00) with a degree of freedom (64), indicating at the level of significance, samples were statistically significant. (0.05). As a result, the null hypothesis is rejected and accepted. A different explanation is that there was a distinction between them

Interpretation and discussion of the results:

Statistics reveal a statistically significant difference on the deep understanding variable between the average scores of the first group of students who studied using the (Neale) model and the average scores of the second group of students who studied conventionally. This difference is in favor of the students in the experimental group.. The following are the contributing factors:A) The (Neale's) model placed students in an unfamiliar situation, including procedural steps in teaching concepts, which contributed to focusing students' attention on what is required should

be completed throughout the lesson through (direct teaching) and access to scientific concepts, so that learning became meaningful and meaningful. Help raise their level of deep understanding.

b) The student in the experimental group is an effective component and less dependent on the school, whose role was instructive and guiding during the lesson and enabled the students to boost their self-confidence. The student assumes the role of a small scientist to look for a resolution to the contradiction and insight into the relationship between concepts through (revision) as it occurs. Discussing lessons from the past that are relevant to the present lesson can help the students understand the concepts and advancements of the most recent or fresh lesson, making them better able to solve issues, develop their self-knowledge, and create conceptual frameworks.

C) The (Neale) model improved students' engagement in discussing and generating ideas through the (review) stage, which is an overall their ideas are sparked or generated, and they perform what is required to meet the cognitive Tables, including clarification, explanation, and prior examination of the new knowledge or problem that will be given.. The current students already have the necessary grasp of the occurrence or issue to learn from it. By mentally bending these Tables, altering them, and employing new Tables, they were able to have a thorough comprehension of the subject matter and experience less forgetfulness.

d) By discussing the outcomes of a particular activity through dialogue and discussion, the (Neale's) model places the students at the center of the educational process and deepens their comprehension.

Conclusions:

After conducting the study and considering the findings, the researcher came to the following conclusions:

1. The positive impact (Neale's) model has on the dependent variable when compared to the traditional teaching approaches.
2. The third intermediate grade pupils' grasp of chemistry was deepened by the usage of (Neale's) model.
3. The (Neale) model of teaching gives pupils equal opportunity by encouraging their active engagement incorporating individual differences into the lesson's activities and.

Several recommendations have been made by the researcher in light of his results, including: As a result of its positive impact on the dependent variable, which is deep knowledge, the (Neale) model demonstrated that it is one of the models that may be used as a teaching strategy. 2- The (Neale) model is appealing to chemistry teachers at the intermediate level because it allows them to abandon the outdated teaching strategies that they themselves employed in the past.

There are two ideas that have been put forward:

1. Conducting research and investigations to make sure this model is valid and appropriate for various classes.
2. Activating this model by experimentation with additional research using fresh impacts and aspects that this study did not examine, such as divergent analytical and scientific sense, and reflective thinking.

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