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A Proposed Teaching Model In The Diversity Of Teaching And Its Effect On The Achievement And Chemical Culture Of Secondary School Students

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Abstract

The aim of research is to found out the effect of a proposed teaching model on the diversity of teaching in the achievement and chemical culture of a sample of fifth class scientist (bio) students. The sample consisted of (69) students randomly distributed to the first two experimental groups (34) students studied proposal of the proposed teaching model, and the second control group studied in the normal method which consists (35) students. It had equivalence in variables (memory, absorption, application and analysis), the researcher prepared the first two tests according to Bloom's classification, consisting of (40) paragraphs, and the second is the chemical culture test (20). The results of the study showed there were significant differences in achievement and chemical culture for the benefit of the experimental group studied according to the proposed teaching model. The results of the research, that recommended the use of the proposed teaching model for the diversity teaching and its impact on the achievement and chemical culture because of its great importance in increasing the scientific knowledge and scientific achievement of the students..

Un Modelo De Enseñanza Propuesto En La Diversidad De La Enseñanza Y Su Efecto En El Rendimiento Y La Cultura Química De Los Estudiantes De Secundaria.

Resumen

El objetivo de la investigación es descubrir el efecto de un modelo de enseñanza propuesto sobre la diversidad de la enseñanza en el rendimiento y la cultura química de una muestra de estudiantes de ciencias (bio) de quinta clase. La muestra consistió en (69) estudiantes distribuidos al azar a los dos primeros grupos experimentales (34) estudiantes estudiaron la propuesta del modelo de enseñanza propuesto, y el segundo grupo de control estudió en el método normal que consiste en (35) estudiantes. Tenía equivalencia en las variables (memoria, absorción, aplicación y análisis), el investigador preparó las dos primeras pruebas de acuerdo con la clasificación de Bloom, que consta de (40) párrafos, y la segunda es la prueba de cultivo químico (20). Los resultados del estudio mostraron que hubo diferencias significativas en el rendimiento y la cultura química en beneficio del grupo experimental estudiado de acuerdo con el modelo de enseñanza propuesto. Los resultados de la investigación, que recomiendan el uso del modelo de enseñanza propuesto para la enseñanza de la diversidad y su impacto en el rendimiento y la cultura química debido a su gran importancia para aumentar el conocimiento científico y el logro científico de los estudiantes.

Research problem

The educational system in Iraq has been trying for years to update the textbooks and the various stages of education, in order to keep pace with the rapid changes in knowledge and technology, but the attention to the general objectives and teaching methods still do not keep pace with changes in the content level, as our educational institutions suffer from the lack of interest of teachers Models, strategies and methods that make the learner responsible for learning in the acquisition of experience and modern knowledge. A review of some researches and studies on the quality of teaching and teaching methods taken by teachers and studies in the school, it turns out that most of the studies and research refers to the use of the traditional method, which relies on indoctrination is the most practice of teachers / science subjects, including chemistry, where the information is provided ready to students They should receive this information and retrieve it dur-

ing the performance of their evaluation exam. To verify this, the researcher may perform the following procedures:

1- Conducting an exploratory study on a sample of female teachers of chemistry for the fifth grade of science (biology) in the third Karkh educational schools - Baghdad. They numbered (11) schools. What teaching methods do they follow in teaching chemistry? As well as the extent of their knowledge of scientific culture, especially in chemistry? After seeing the answer, it was found that their knowledge of teaching methods does not go beyond the traditional method and simple discussion, and that they are not familiar with teaching models or teaching design, as the answer to scientific culture at an unacceptable level.

2- Meet the supervisors specialized in the directorate and ask them about the development in the educational process at the level of objectives, content and methods of teaching chemistry? The answer was that the Ministry is serious in continuing to update the textbooks of chemistry and all levels of education, but the methods and methods of teaching followed by teachers / teachers still do not raise the motivation of students towards study and learning.

Based on this, in the light of studies such as Badawi (2014) and other exploratory studies, the researcher decided to build a proposed teaching model according to the diversity of teaching, which means using multiple teaching methods that provide students with different abilities, preferences, interests and educational needs ... Equal opportunities to understand and absorb information and use In everyday situations. It also allows students to take responsibility for their learning through the diversification of teaching, which would reduce the routine and boredom experienced by students during the lesson, so that students make active participants in the educational learning process positively. To think about what they read or hear, and thus increase their chemical culture and be able to express their thoughts in their minds with a convincing scientific methodology.

Therefore, the problem of the current research is determined in the answer to the following question:

Does the proposed teaching model in light of the diversity of teaching have an impact on the achievement and chemical culture of fifth grade students (biological)?

Importance of the Research

The importance of the current research is summarized as follows:

1 - The introduction of chemistry in new ways according to modern trends may help in raising the level of achievement of students in chemistry.

2 - The present study may be useful in providing teachers teaching the importance of pre-preparation of the material on this type of education.

3 - The proposed teaching model may contribute to the establishment of an exciting and stimulating learning environment for classroom learning that helps students increase their motivation towards teaching and learning.

4 - may contribute to the proposed teaching model to improve the level of academic achievement among students to the diversity of learning styles to meet individual differences and trend and tendencies.

5 - Open the field for researchers to provide other research to promote the teaching of diversity (differentiated) in terms of its various strategies, which help in the diversity of experiences that the school provides for students.

6- Provide chemistry teachers with standardized tests that can be used to measure the achievement of students and their chemical culture.

7- To benefit the chemistry teachers from the daily teaching plans that have been tried in the classroom environment in order to improve the teaching process.

8. Identify the role of the school in organizing the educational environment that helps in the occurrence of learning.

Research Objectives: Aims of The Research

The current research aims to:

1 - Building a proposed teaching model in the light of the diversity of teaching to students.

2 - identify the impact of the proposed teaching model in the light of the diversity of teaching in achievement.

3 - Identify the impact of the proposed teaching model in the light of the diversification of teaching in the chemical culture of students.

Research hypotheses: The Research Hypotheses

In order to verify the research objectives, the following hypotheses were formulated:

1. There is no statistically significant difference at the level (0.05) between the average grades of the experimental group students who will study according to the proposed teaching model in light of the teaching diversification and the average grades of the control group students who will study according to the traditional method of achievement.

2. There is no statistically significant difference at the level (0.05) between the average scores of the experimental group students who will be studied according to the proposed teaching model in light of the teaching diversifi-

cation and the average scores of the control group students who will study according to the traditional method in chemical culture.

Research Limits: Limitation of the Research

The current search was limited to:

1 - fifth grade students (biological) in the day schools of the Directorate General of Education Karkh third / Baghdad.

2 - chapters V and VI VII, namely: (chemical kinetics, acids, bases and salts, chemistry of polymers) of the book of chemistry scheduled for the fifth grade biological, i 6 of 2017.

3- The second semester of the academic year 2017-2018

4 - Strategies (brainstorming - cooperative learning (strategy of thought - pair - Share) - Strategy K.W.L.- - cognitive representation - problem solving)

Define Research Terminology terms

1 - Teaching Model

He defined it (Tawfik and Mohammed, 2002) as “an application of learning theory, which differs from it in terms of objectives and content. It seeks beyond the descriptive and interpretive nature of learning theory by defining an organized set of procedures that can be applied in the classroom.”

(Tawfiq and Muhammad,

2002: 139)

He defined it (Aldreij, 2004) as “an analytical tool or method of analysis as it contributes to the technical development of education in general, it also contributes to the foundations of teaching science.” (Aldreij, 2004: 32)

Procedural Definition:

A set of procedural steps employed by the researcher to teach chemistry in the educational situation and proceed according to the strategies of diversity of teaching in the classroom in order to achieve educational outcomes - learning and reveal their strengths and strengthen their weaknesses and treatment, in order to succeed in raising their achievement and their chemical culture, and determines the role of the school and student and the method of evaluation .

2 - Variety of teaching: Variety teaching

Known as Kojak et al. (2008): “It means knowing the learners’ different needs, previous knowledge, their willingness to learn, their level of language, their preferences and their preferred learning styles, and then re-

sponding to all of that in the teaching process. So teaching diversification is the process of teaching and learning pupils, including many differences in one semester.” Et al., 2008: 24)

Procedural definition

It is based on a variety of strategies that enable the school to respond to the needs of multiple students within a single classroom.

Brain storming

Arafa Abou Sarhan (2000)

“It actively addresses the problem using the mind, by generating a list of ideas that lead to new and useful solutions.” (Abu Sarhan, 2000: 122).

- Problem Solving

Nabhan (2008) defined it as “the set of processes performed by an individual, using information and knowledge already learned, and the skills acquired in overcoming a new, unfamiliar situation in controlling and finding a solution” (Nabhan, 2008: 199)

- K.W.L Strategy)

Defined by Abdul Wahab (2005): It is one of the metacognitive strategies that mean: “the behavior and behavior of the learner with the help of the teacher and guidance to determine the extent of knowledge, awareness and awareness of activities and mental processes and readings before, during and after learning to remember and understand information and planning for it.” (Abdel Wahab, 2005: 165).

Cooperative learning: Cooperative learning

Defined him (Al-Hailah, 1999) as:

(To create an organizational structure for the work of a group of students so that all members of the group indulge in education according to clear roles and specific with the assurance that each member of the group learns educational material)

(Resourcefulness, 1999: 232)

- Think-pair-share strategy

Known by Ahmed (2006): It is one of the strategies of active learning meaningful and goes through three steps are thinking, pairing and participation (Ahmed, 2006: 11).

- Cognitive Representation: Cognitive Representation

Defined (Khuzai 2009): - “A strategy that deals with the individual information in its various forms with the aim of retention and absorption relying on linking and derivation and synthesis and in several formats in-

vesting the characteristics of cognitive formation without adhering to a rigid idea in order to develop his knowledge structures”

(Khuzai 2009: 295)

3- Collection: Achievement

Arafa Good (1973)

“Information gained or mastery of performance from sophisticated knowledge in subjects, and this achievement is determined by test scores or scores developed by teachers, or both.”

(Good, Carter, dictionary: 1973: 7)

Procedural definition

The amount of knowledge, information and abilities to solve the problems of the fifth grade students after passing through educational learning experiences as measured by the bikes that they will get in the achievement test during the research period.

4. Chemical culture

The researcher did not find a definition of the chemical culture, which is an essential and important part of the scientific culture, it has prepared two definitions, one theoretical and the other procedural as follows:

Theoretical chemical culture is the result of information, knowledge and skills. It is an integral part of the general culture owned by the individual, or the specialist, which increases according to educational attainment and specialization, which reflects knowledge of chemicals and their properties, uses, benefits and risks and have knowledge in how to deal with them carefully and according to safety rules and procedures.

Procedural definition

Is the amount of information acquired by the student and the symbols and laws of the scientific subject of the book of chemistry, and employ it in educational situations, and measured by the degree obtained by the student in the test of chemical culture prepared for this purpose.

Theoretical framework

The idea of diversifying teaching began to take its place in the educational institutions of different countries since 1989 when the Declaration of the Rights of the Child, and its studies and research on the idea of diversity of teaching, which dealt with the human brain and intelligence and recommended by scientific conferences to provide learning taking into account the characteristics of students with regard to teaching methods and taking. The curriculum focuses on the basic concepts and ideas that relate to the life of the learner, and aims to develop the learner's understanding of creative thinking and problem solving (Kojak et al., 2008: 12). The cur-

riculum is designed for each stage in a variety of teaching methods to suit the needs and requirements of each student to achieve the greatest possible learning (Jaber, 2005: 53).

Hence, we believe that the idea of diversity teaching has received the attention of educators and researchers as one of the most important ways that will help to achieve the objectives of the curriculum, as the diversity of teaching is one of the useful evidence to address the disparity as it is an effective way to link teaching needs of learners and to achieve the greatest possible learning for each learner in the article Given that the student makes active and positive participation in the educational process, as well as the view that teachers vary in their activities, the material they provide, and the assessment they practice, as they use a variety to help each student to succeed in the educational process.

(Butler Lowe, 2010: 86)

The idea of diversity of teaching began to take place since 1989, as the names of this type of education are numerous, and we find that educators call it several names such as differentiated education, diverse education, differentiated teaching, and differentiated education, but they all point to one concept. For the philosophies of education, which believes that the learner is the focus of the educational process, and therefore developed specialists to diversify teaching a set of foundations and principles on which teaching is based and that make the teachers to follow and rely upon when organizing and presenting the content of the educational material, Teaching provides a suitable learning environment for all students because it is based on the diversity of methods, procedures and activities, and that students learn in different ways, as there is no single teaching method suitable for all students, and that the most important basis for the diversity of teaching is the active and positive participation of the learner, students should recognize their abilities and patterns Their learning, participation in setting goals in the light of these characteristics, and diligence in achieving those goals, and then assess their achievements and achievement of the material and the extent to which they achieve other goals (Kojak, 2008: 25-30).

Therefore, it has become necessary for the teachers in the process of teaching according to (diversification of teaching) to make some fundamental adjustments to the educational attitudes and to suit the possibilities of students and mental abilities and psychological preparations and needs in the classroom, which does not mean changing the fundamentals of education, but diversify the methods, implementation and delivery of

educational material through Diversity in the methods presented according to the needs of students and provide equal opportunities for all students to achieve the desired goal in one lesson (Alhalisi, 2012: 63).

The educational designs and teaching models are one of the methods of organizing the subject in accordance with the needs and abilities of the students, as they are designed according to educational and psychological bases that make students participate in the educational process according to their abilities and needs. Educational models provide students with immediate feedback on what they have studied. (Resourcefulness, 1999: 30-31).

The above should be concerned with the teaching of chemistry by providing cultural experiences in addition to scientific material, including chemical culture and at all levels of study. This is because students' access to an appropriate level of chemical and scientific culture depends on chemistry teachers and their knowledge of scientific and technological enlightenment, the quality of content provided in chemistry curricula, and the way in which the subject is taught.

Thus, we believe that learning according to the diversity of teaching has become a teaching-learning mode, where the focus is on direct interaction within the classroom, teaching by the diversity of teaching is the quick and ideal solution to develop the educational process in the present day.

Previous studies

1- Rehaily study (2014) This study aimed to know the effect of using differentiated education strategy on the achievement and direction of science subject in second grade middle school students, the researcher prepared two tests, one achievement and the other, the trend scale was verified, the two tests were applied to the research sample and the results exceeded the group. Experimental as the use of differentiated education strategy is effective in the teaching process.

2 - Gilbert (2012), which aimed to educate teachers on the need to use differentiated teaching methods in all classrooms, the results revealed that the use of differentiation affects the perception of teachers and therefore affect the education of students and that teachers lack time to implement differentiated education and they need administrative support And training to implement it.

3- Hamoudi study (2016) The study aimed to build a training program for education for the sustainable development of biology teachers and its impact on their scientific culture and environmental awareness for students in middle schools, the researcher prepared a measure of scientific culture and

measure the environmental awareness of their students, the results showed the superiority of the experimental group teachers who trained According to the program for sustainable development in the variable culture and environmental awareness on the control group.

Search procedures:

Procedural steps used to achieve research objectives and hypotheses include:

First: Building the proposed teaching model

The researcher followed the following steps in building the proposed teaching model as follows:

1. Review the bases of building the teaching model through studies and related literature such as the study of Katami et al (2000), Al-Zind (2004), Al-Zahawi (2005), etc., to identify the most important steps and procedures followed.

2 - to know the foundations, principles and assumptions underlying the theory of the diversification of teaching and the extent of its application in the form of a proposed teaching model for teaching chemistry.

3 - Access to the objectives of teaching chemistry in the secondary stage and emphasize the construction of teaching models make the learner active and a major focus in the educational process.

4 - Identify and analyze the content of the chemical information contained in the fifth grade textbook and how it is organized to help the student to understand how ideas, information and facts are related to each other.

5 - Analysis of the characteristics and needs of learners by providing a questionnaire to identify the most important educational difficulties encountered when studying the material, as well as to meet a sample of teachers of chemistry.

6- The researcher prepared a plan for the proposed teaching model according to the diversity of teaching and presented it to a group of experts and arbitrators in the field of psychology and teaching methods.

7. The behavioral objectives of each unit of study were prepared according to Bloom classification in the field of knowledge, memory, comprehension, application and analysis, and presented to a group of specialists.

8- Preparing the teaching plans according to the steps of the proposed teaching model for the content of the subject to be taught, which amounted to (31) teaching plans, and it was presented to the experts and arbitrators, Annex (1).

9 - Choose the appropriate strategies for the educational positions included in the proposed teaching model according to the diversity of teaching,

including brainstorming, problem solving, cognitive representation, cooperative learning (and strategy of thought - pair - share) and KWL strategy and according to the steps of the teaching model.

10 - Selection of educational activities and means of the educational situation and the provision of materials and tools for the lesson.

11- Building two tests, one for collection and the other for chemical culture.

12. The proposed teaching model was applied to a survey of 29 female students of the research community for four consecutive days based on the teaching plans that were built according to the diversity of teaching and according to the construction of the steps of the model in order to investigate the possibility of its application.

13. Conducting a process of evaluation of the proposed model, where the preliminary evaluation of the model was conducted through a subject to a group of experts and arbitrators in chemistry, as well as applied to the exploratory sample, as was the formative (structural) evaluation of the model during teaching according to the steps of the model based on diversification Teaching After each step of the teaching model, then make a final evaluation of the model at the end of the experiment.

In order to clarify the stages of building the proposed teaching model and the procedural steps for each stage, the form is designed as agencies:
Second, justifications for building the proposed teaching model

1 - The use of most teachers of the traditional method of teaching chemistry, which emphasizes on the conservation of students subject to the results of the questionnaire distributed to teachers of chemistry.

2 - the weak capacity of students to employ the subject in new situations and this is what the researcher concluded when meeting with a number of chemistry teachers in the Directorate General of Karkh / Third - Baghdad

3. Teaching models are commensurate with developments in effective teaching methods.

3 - the need to take into account the characteristics and needs of students and their readiness when planning the lesson.

4 - the importance of the transition from traditional teaching to active teaching in the educational process, which makes students interact with the teaching position.

3. This model may help develop teaching and learning better.

Search procedures

To achieve the objectives of the researcher, the researcher adopted the

experimental design of partial control with two groups (control and experimental) with two-dimensional test to measure achievement and chemical culture, as shown in the following diagram:

Type of Test	The dependent variable	Independent variable	Equivalence	Group
dimension	Collection Chemical Culture	The proposed teaching model		Experimental
		traditional method		Control

Scheme (1) Experimental design

Second: Research population and its sample: Research population and its sample

1- Research population:

The research community consists of day preparatory schools (for fifth grade biology students) in the Directorate General of Karkh / 3, Baghdad.

2. Research sample

- Umm Al-Mo'minin Secondary School for Girls, which is affiliated to the Directorate General of Education in Baghdad, Karkh III, was chosen intentionally to apply the research experience in order to show the school administration cooperation with the researcher, in addition to the presence of a good school to teach the two research groups, and willingness to train on how to teach according to the proposed teaching model in the light of diversity Teaching.

Third: Control procedures

Internals Validity of Experimental Design

Before starting the experiment, the researcher made sure that the two research groups are statistically equal in the variables that may affect the credibility of the results as follows (the chronological age of the students and the previous achievement of the fourth chemistry, the previous chemical information, the chemical culture and the academic achievement of the parents). As well as the control of extraneous variables and the results indicate their equivalence.

Fourth: Research Requirements: Research Procedures

Current research requirements include:

- Determination and organization of the subject: The chapters of the fifth, sixth and seventh are identified: (chemical kinetics, acids, bases, salts,

chemistry of polymers) of the book of chemistry scheduled for the fifth grade of scientific (biological), i 6 of 2017.

- Formulation of behavioral purposes:

In the light of the general objectives of teaching chemistry in the preparatory stage, a number of observable and measurable behavioral purposes were formulated, totaling 150 behavioral purposes classified according to the first four levels of Bloom classification in the cognitive domain (remembering, assimilation, application, and analysis).

- Selection of teaching strategies

The researcher adopted the proposed teaching model in teaching with the selection of appropriate strategies for the educational positions included in the proposed teaching model according to the diversity of teaching, including brainstorming, problem solving, cognitive representation, cooperative learning (think - pair - share), and KWL strategy and according to the steps of the teaching model.

- Design (preparation) teaching plans

In the light of the educational content of the four chapters and the behavioral purposes derived, (31) teaching plans were prepared for the experimental group that studied the proposed model according to the diversity of teaching and (31) teaching plan for the control group that studied according to the usual method of teaching.

Selection of activities, means, animations and enrichment drawings

- The researcher used a variety of learning activities consistent with the objectives of the lesson and the proposed teaching model according to the diversity of teaching.

Fifth: Research Tools: Instrumentation

1- Achievement test: - One of the requirements of the current research is to prepare an achievement test as the researcher has followed the following procedures:

1.1- Determine the educational content: It represents the educational material to be taught and it has already been defined.

1.2- Formulation of behavioral purposes: 150 cognitive behavioral objectives were formulated distributed over four levels of cognitive plum (remembering, assimilation, application, analysis).

Preparation of the Table of Specifications

One of the important requirements in the preparation of achievement tests is the preparation of the specification table, and to build the specification table for the content of the three chapters to be taught from the book of chemistry took into account the behavioral purposes to be achieved and the

importance of each chapter and thus identified by (40) paragraphs and thus calculated percentages for each cell in the specification table According to the equations and as follows.

Calculate the weight of behavioral goals according to their four levels. It was done in the following manner

Weight of targets = $\times 100$

B - calculate the weight of the content according to the number of pages in each chapter and as follows:

Content weight = $\times 100$

The number of questions per class and for each level was calculated as follows

Number of questions per cell = percentage of goal \times percentage of content \times number of total paragraphs

Table (1)

Schedule Specification table for achievement test items distributed according to the relative weights of each content

Total	analysis	application	Absorption	memory	Weight of behavioral purposes		Classroom content
					Weight of content	Time	
100%	14%	11%	45%	30%			
Number of paragraphs							
10	1	1	5	3	26%	8 Servings	Molecular kinetics
18	3	2	8	5	45%	14 Serving	Acids, bases and salts
12	2	1	5	4	29%	9 Servings	Polymer Chemistry
40	6	4	18	12	100%	31 Serving	Total

Preparation of test items:

A multi-choice objective test was prepared, and the questions and paragraphs were distributed according to the four levels of behavioral purposes

es.

1-5- Test Validity: Test Validity

The validity of the test represents the measurement of the characteristic for which it was developed (Al-Huwaidi, 2004: 40). The test was presented to a group of experts and arbitrators in the educational, psychological and chemistry sciences.

Statistical analysis of test items

The researcher applied the achievement test on a survey sample from the research community other than the basic research sample (preparatory Kadimiya for girls), which reached a number of (100) students, and who studied the vocabulary of the educational content included in the test, and found that the test paragraphs and instructions were clear, and the average duration It took the student to answer the paragraphs was (50) minutes, then corrected the answers to the paragraphs of the test, then arranged the scores of students descending from the highest to the lowest and took the highest 27% of the total grades to represent the (upper group) and took the lowest 27% of the scores To represent the college Then, the difficulty coefficient of each paragraph of the questions was calculated and found that the value of (0.26-0.70) and calculated the discriminatory power of each paragraph of the questions was between (0.32 - 0.69), also found that all alternatives have a negative value, which indicates their effectiveness .

1-7- Reliability

1.7.1 Stability of the achievement test

The equation (Koder Richardson 20) was used to calculate the stability of the test and was equal to (0.891). Thus, the psychometric properties of the test were verified. Thus, the number of paragraphs of the test in its final form (40) paragraph of the type of multiple choice, where the highest score on the test will be (40) degree and the lowest score (zero).

1-8- Chemical culture test

One of the requirements of the current research is to prepare a test for chemical culture to be used in the equivalence of the two research groups.

1-8-1- Chemical Culture Test:

After researching a group of sources, studies and tests and a review of literature and studies related to scientific culture, the researcher did not find studies on chemical culture concerned with the fields of chemistry, which

is an integral part of the general culture, which expresses knowledge of chemicals and their properties, uses, benefits and risks. With the expertise of some specialists in the field of education and chemistry and the methods of teaching the researcher reached a formula of test paragraphs, which consisted of 24 paragraphs in its initial form in chemical culture.

First: the sincerity of the test

1- Virtual Honesty:

The chemical culture test was presented in its preliminary form to a group of experts and arbitrators in order to verify its validity and verify its sincerity as a research tool and to express their views on its paragraphs. Appendix (1) In light of this, more than 80% of their opinions were adopted. Paragraph if not get (4) paragraphs of the percentage mentioned annex (3).

Where the responses to this test are multiple-choice, corrected the test by giving one score for the correct answer for the paragraph, and a score of zero for the wrong answer, thus the highest score can be obtained by the student (20) degree, and the lowest score will be zero, and a default average (10) Degree.

Second: Statistical analysis of the test items:

Sincerity test

The validity of the content of the test was verified by presenting it to a group of experts in educational and psychological sciences, chemistry and teaching methods. It was found that the percentage of the validity of the paragraphs ranged between (0.44) and (0.89).

Honesty of construction

The validity of the test was verified by applying it to a sample of 32 students. The correlation coefficient was calculated as values ranged between (0.36) and (0.73) which are statistically significant.

Test stability

The consistency of the test was calculated using the method of internal consistency using the Elva Kronbach equation.

Sixth: Procedures of applying the experiment: The following steps were followed to apply the research experiment.

1- The researcher visited Umm Al-Mu'minin secondary school for girls and met with the school principal and the chemistry school. The purpose of the research was clarified.

1- The researcher provided the school with the teaching plans of the experimental group which is taught on the proposed teaching model according to the diversity of teaching, with emphasis on teaching the control group in the traditional way.

3 - The researcher visited the school in class to learn how to apply the experiment in accordance with the proposed model of teaching.

4 - I started teaching the research groups on Tuesday 20/2/2018 until 8/4/2018 and four classes a week and the researcher made sure that the two groups are taught both as determined

First: The experimental group: The group studied according to the proposed teaching model according to the diversity of teaching and the appropriate strategies for the educational attitudes involved in the proposed teaching model including brainstorming, problem solving, cognitive representation, cooperative learning (think-pair-share strategy) and KWL strategy and according to the model steps. Instructional supplement of teaching plans (2).
Second: Control Group: This group was studied using the usual method according to the following steps:

- Define the goal of the lesson.
- The school gives an introduction to the new topic and linking the previous experiences of students.
- Explain the scientific material for students and then ask some questions related to the topic and discuss them in the answers.
- Engage students to solve some examples
- The school summarizes the subject of the lesson.
- Calendar: The school asks oral questions to students.
- Determine the homework of the scheduled book.

Test application

After completing the teaching of the subject of chemistry and according to the teaching plans prepared for each group and within the specified time to teach the subjects of the experiment for the two research groups, the achievement test was applied on Thursday, 12/4/2018 at Umm Al-Moameeneen Secondary School for Girls the test. The students' answers to the test were corrected according to the answer key. Their scores were calculated, and then the chemical culture test was applied to the students of the research sample for the purpose of statistical processing, analysis and interpretation of the results to reach the research objectives.

Seventh: Statistical Methods:

The researcher used statistical data processors using the statistical program ready for social sciences (known as spss-x).

First: Presentation of Results: -

- Objective 1: "Building a teaching model based on the diversity of teaching to teach chemistry."

The proposed teaching model was built in the light of the diversity of

teaching, where the most important theoretical and procedural steps in its preparation were given, and a full and planned description of how to build the teaching model according to the diversity of teaching in one lesson and thus achieved the first objective.

- Second Objective Achievement test results for chemistry.

For the purpose of validating the first hypothesis, the arithmetic mean and standard deviation were calculated for the scores of the experimental and control groups, as shown in Table (2).

Table (2)

Arithmetic mean and standard deviation of scores

Statistic al function	Sig. level	Degree Freedom	T value		standar d deviati on	Mean arithme tic	Total	Collectio n
			Tabular	Calculated				
Function	0.05	67	2	3.007	2.142	28.059	Experimental	the test Achieve ment
					2.988	26.171	Control	

It is noted from the table above that there are significant differences between the two research groups and in favor of the experimental group in the achievement test.

- The third objective of the results of the chemical culture test:

For the purpose of validating the second hypothesis, the arithmetic mean and standard deviation of the scores of the experimental and control groups in the chemical culture test were calculated as shown in Table (3).

Table (3)

Arithmetic mean and standard deviation of students' degrees in chemical culture test

Statistical function	Sig. level	Degree Freedom	T value		standar d deviati on	Mean arithme tic	Total	Collectio n
			Tabular	Calculated				
function	0.05	57	2	3.647	1.683	11.912	Experimental	the test Achieve ment
					2.162	10.229	Control	

It is noted from the table above that there are significant differences between the two groups for the benefit of the experimental group in the test of chemical culture and thus reject the zero hypothesis and accept the alternative hypothesis.

Second: Interpretation of Results:

The researcher explained the superiority of the students of the experimental group who studied according to the proposed teaching model according to the diversity of teaching in the collection and chemical culture than the students of the control group who studied according to the traditional method (normal) for the following reasons:

1 - The teaching using a proposed teaching model according to the diversity of teaching increased the process of learning material according to the characteristics and tendencies of students, which increases students' understanding of the content of the study.

2 - The use of the diversity of teaching in one lesson in accordance with its diverse strategies encouraging students, as they have a hoof to learn more through the element of competition among students and receive reinforcement and feedback, and gives an opportunity for students to integrate into the process of education actively through the discussion of solutions.

3 - The use of a teaching model according to the diversity of teaching in learning make the student the focus of the educational process by giving it a role to reflect on the teaching material and express their opinion.

4 - The diversity of teaching is more fun for students than the usual way, teaching diversity teaching according to strategies moves the school from the role of the initiator to the role of supervisor and enhanced in education, and conduct dialogues and discussions and exchange of experiences and rethinking and reflection on the material, which increases their chemical culture and the acquisition of educational material.

Third: Conclusions

In the light of the findings of the researcher concluded the following: -

1). The effect of the proposed teaching model according to the diversity of teaching increased the academic achievement of female students.

2). The proposed teaching model according to the diversity of strategies has a significant impact in increasing the cognitive abilities of students and increase their chemical culture.

3). The chemistry needs a variety of teaching strategies so that the student can absorb the material and retrieve it.

4). The possibility of developing mental abilities and increasing the chemical culture of the learners through the use of the method of discussion, dialogue and exchange of ideas lead to better learning.

Fourth: Recommendations: In light of the above, the researcher recommends the following:

1 - Use the proposed teaching model according to the diversity of teaching strategies in the teaching of chemistry because of its significant impact in increasing the achievement of students.

2 - Introducing the philosophy of diversity of teaching and strategies through holding training courses for teachers of chemistry in secondary schools.

3 - Training students of the Faculty of Education on the use of strategies for diversity of teaching within the vocabulary of teaching methods.

Fifth: Proposals: As an extension of the results of the current research, the researcher suggests some future studies as follows:

1. Conducting a similar study to the current study on different subjects in achievement, culture and other stages of study.

2 - Conducting a similar study with the same variables for students of private schools to be compared with the level of scientific students of public schools. Similar policy and other variables such as creative thinking and environmental culture.

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Supplements

Appendix (1)

The names of the arbitrators and the nature of the consultation

The name of the arbitrator	s
Prof. Nima Abdul Samad Al-Asadi / Teaching Life Sciences / University of Kufa / College of Education for Girls	1
Prof. Dr. Anwar Hussein Abdul Rahman / Curricula and teaching methods / University of Baghdad / College of Education	2
Prof. Abdul Wahed Mahmoud Mohammed / Teaching Mathematics / University of Basra / College of Education for Pure Sciences	3
Prof. Abdul Razzaq Shaneen Alwa / Teaching Chemistry / University of Kufa / College of Education for Girls	4
Advertisement And Sun Maher / Teaching Chemistry / University of Baghdad / College of Education for Pure Sciences Ibn al-Haytham	5
Prof. Basem Mohammed / Teaching Mathematics / University of Baghdad / College of Education for Pure Sciences	6
Prof. Dr. Hoda Karim / University of Mustansiriya / teaching physics / College of Education	7
M.D. Aisha Muhanna Mohammed / Chemistry / University of Baghdad / College of Education for Pure Sciences	8

2 - scientists estimate the chemistry in explaining and interpreting the calculation of the speed of various materials.

Teaching aids: - Blackboard, crayons, presentation of charts via Power-Point (Projector)

Procedural steps to implement the teaching model according to the teaching diversification:

Boot: (5 minutes)

There is a discussion of the previous topic and studied by the students to help them understand the subject of chemical kinetics, which is concerned with the speed of reaction and mechanics as follows:

School // We studied in previous topics the concept of chemical changes and defined as:

One of the students / reactions that occur between the reactants to form the resulting material, and expressed by the chemical equation balanced.

School: What do you benefit?

One of the students: useful in calculating the number of moles and mass and the volume of reactive and resulting gases.

Dear student, the chemical equation did not tell us about other things related to the speed at which the reactants are transformed into products, as well as the number of steps that the reaction goes through to form the products. What we'll learn in our lesson for today.

Note: The school asks a question in the form of a problem for all students and according to strategies that match the wishes of students according to the questionnaire of learning that was distributed to them.

The school asks: What is the speed of interaction and how is it measured?

The first group studied according to the strategy of brainstorming

Phase 1: (pre-brainstorming)

- Introduce students to the principles and characteristics of the brainstorming session, accept ideas - abundance of ideas - defer criticism of ideas, and determine the roles of students in the group, including the group leader and the recorder.

Second stage: brainstorming cycle:

Rephrasing the question in other wording to stimulate the thinking of students,

By knowing the changes that take place between the reactants to form the resulting substances there are steps through which the reaction is involved. What is the reaction speed and how is it measured?

School: gives a short time to make students think and meditate to solve the question and write as much definitions and examples and write the law of speed of interaction, and go to the other group

One of the students: gives the definition of the speed of reaction is the amount of change in the concentration of one of the reactants or resulting in the unit of time, and the speed of reaction vary, some of them very fast and get directly and in a fraction of a second such as the reaction between the acid-base and combustion reactions.

Another student: There is also a moderate reaction speed that takes a number of minutes to several months, such as iron rust and interactions that lead to the ripening of fruits and vegetables.

Another student also recalls that there are very slow reactions that take several years or millions of years, such as those that lead to human growth, aging and turning dead plants into coal.

Another student As for the measurement of reaction speed, there is a special law of reaction speed

Is the rate of reaction speed =

Rate =

(Delta), means change (final - primary)

(Square bracket) means the molar concentration in mol / L, for example X means the molar concentration of material X

t Change in time (time 2 - time 1) and its second, minute and hour units
School // Well done

The third stage (after the brainstorming cycle) (evaluate ideas):

- * The listed answers are written to the students on the board.
- * The original and useful ideas are arranged and categorized as applicable and represent valid answers.
- * Criticize ideas and choose good ideas from them.
- * The right solutions are reached through what has been put forward from the students and the school makes a summary of the correct answers and write them on the blackboard

After what has been listed by the answer by all groups are moving to another question in the same steps above and the school asked another question for students to blow their ideas.

Q 1 - through your answer to the previous question Compare between the speed of reaction in terms of reactants and materials resulting law of reaction speed by symbols and sacrificed it?

The school leaves room for students to think individually to blow their ideas to be recorded on the board by the group's registrar.

The school then allows students to write their thoughts individually for three minutes and then remind your thoughts to the group leader. Then the school moves to the rest of the groups to record their ideas and discuss them and criticize the incorrect answer

The second group Using cooperative learning strategy (Think - Pair - Share)

After the school discussed the previous topics with the students, the school poses the question to the students through a written paper with the question addressed to them and the school asks:

1 - Each student to spend one minute thinking about the question posed in the worksheet.

2. Each student requests to discuss her close classmate for five minutes.

3 - each student participates with each other within the group in consultation and dialogue with them reached from the answer to the question

The school then asks the whole group to participate in answering the following questions:

Q 1: - What is meant by chemical reaction speed.

Q 2: - Give examples of the reaction speed in general.

Q 3: - You write the law of reaction speed

Thus the rest of the questions to ask students.

4 - Here the school asks couples to stop the bilateral dialogue and start collective participation and supervision of the school, and then requests the school to present what was reached by dialogue through the conclusion and work summary

Through our study of the subject we conclude that the speed of reaction speed is the amount of change in the concentration of one of the reactants or resulting in the unit of time, and the reaction speed varies, some of them are very fast and occur directly and in a fraction of a second such as the reaction between the acid-base neutralization and combustion reactions. It takes a number of minutes to several months, such as iron rust and the reactions that lead to the ripening of fruits and vegetables, and there are very slow reactions take several years or millions of years, such as reactions that lead to human growth and aging and turn dead plants to coal. **Speed of Interaction** There is a special law of reaction speed

Is the rate of reaction speed =

The third group using problem solving strategy

At this stage, you ask the problem (problem) and identify it to the students to be answered.

* Here a group of students collect information related to the problem and through their previous experience and information available in the book of chemistry scheduled.

* Students give temporary solutions to the problem (question), which may be accepted, modified or rejected, and the solution should be out of the problem and connected to it, and be testable.

* At this stage are tested the validity of the solutions provided: and follow-

ing scientific steps organized.

* Final stage Conclusions, generalizations and evaluation, the final result is reached, which represents a solution to the problem or question.

Thus for the rest of the questions that will be discussed in the lesson

The fourth group using KWLH strategy

The school distributes tasks to a group of students and through an agenda including assignments (what does the student charge for topic K, what do you want the student to know about topic W, what did the student learn from topic L, get more information H)? She then asks them to fill in the first field of the table, which relates to answering the following questions:
Step 1: - School: Record in the first column all you know about the subject of reaction speed and examples of the speed of interaction and usefulness, and you have five minutes to put forward your ideas.

- Students: They record what the tariff of students on the subject of speed of interaction and usefulness in consultation with their colleagues.

- The school receives the answers from the group leader and is recorded in the first field with the postponement of reinforcement and acceptance of all ideas

Step 2: - School: Ask the student to write what they want to know about the subject of the speed of interaction and its benefits in the form of questions in accordance with the objectives of the lesson, then the school to answer their questions and what they want to know about the subject of the lesson, and after making sure to understand and absorb the material and achieve the desired objectives leaves the school students To record their observations and the information they received.

Step 3: - School: Write what you learned on the subject of speed of interaction (and ask them to provide what they learned from the material orally.

Step 4: - School: Write in the last column any additional questions you want to know about our topic for the day after that the school will ask questions of the calendar to see what has been gained information on the subject of speed of interaction and benefits.

After that, we move on to the other questions of the course to be explained in detail according to the same steps.

The fifth group using the strategy of cognitive representation

School: raises students by asking questions about the subject and the main points by writing them on the blackboard, and then ask the students to answer them.

School: What is meant by the speed of interaction

Student: Give the answer

- Repeat the correct answer with the help of the school
- Give the opportunity for students to write down the answer in the book and put lines under important words.

Thus for the rest of the questions are asked to students to provoke them and give their answers on the subject of the lesson.

Here, the school repeats what has been mentioned by the conclusion and give the correct solutions to the subject.

Calendar: The school addresses questions about the subject and asks students to answer them.

1. Define the speed of the chemical reaction in its own way.
- 2- Explain the usefulness of reaction speed.
- 3- The students show that the reaction speed of the materials varies according to the type of reactants.
4. They write the law of reaction speed.
5. Naming the symbols used in the law of reaction speed.
6. It compares the reaction speed in terms of the reactants and the resulting materials.
- 7 - Explain the development of a negative signal in the law of the speed of reactants.

Here, after asking questions to the students and using different strategies are discussed all the activities provided by the school with the students to achieve the desired goal mechanism

homework

Write a brief report on the reaction speed and changes in the reactant.

Appendix (3)

Chemical culture test

1 - Inorganic acid used by Jabir bin Hayyan, and called silver water and sometimes decomposed water and water sharp fire mummy, strong used in the production of fertilizers and explosives What is it?

A- Hydrocarbons B- Silver nitrate C- Phosphoric acid D- Nitric acid *

2 - through your study and study of the elements in nature, which is more present in the universe?

A- Nitrogen B- Hydrogen * C- Oxygen D- Carbon

3. Identify which of these elements is an alkaline-based aqueous solution?

A-6C B-7N C-11Na * D-16C

4. What is the cause of the fizz when shaking the bottle of soft drinks?

A-Co B-Co2 * C-N2 D-O2

5- What is the scientific name for rust?

(A) Iron carbon, (b) Iron oxide, (c) Iron hydroxide, (d) Iron ammonia

6 - What is the scientific name of the gas that comes out of the vehicle exhaust and is considered polluting the environment?

A- carbon dioxide b- carbon sulfide c- carbon monoxide * d- carbon dioxide

7 - Silver metal element which is used in the packaging of food bottles is it?

A- Plastic B- Aluminum C- Paper D- Tin *

8- Silver color liquid used in making thermometers What is it?

A- mercury b- copper c- lead d- iodine

9. What are the chemicals produced from oil used in detergents?

A- Biochemical B- Hydrocarbons C- Petrocarbons * D- Organic Chemicals

10. When you study the periodic table, what are the elements according to the order?

A- increasing mass number b- increasing atomic number * c- increasing number of neutrons d- all that is stated

11- Which of the gases produced when burning oil, coal and kerosene are?

A) Nitrogen oxides, iron oxides, sulfur oxides, carbon dioxides

12 - Most of the fires that occur sometimes caused by?

A - neglect of safety instructions B - failure to take preventive measures c - generate spark * D - the speed of the spread of gas

13- What material is used to remove oil stains from clothes?

A) ethane hydroxide b) water c) methane hydroxide d) carbon tetrachloride *

14. What material can be used to prevent freezing of water at zero degrees Celsius?

A- Sodium chloride B- Calcium chloride C- Potassium chloride D- All mentioned *

15. All organic compounds found in nature contain an element?

A) oxygen, b, hydrogen, c, carbon, d, nitrogen

16- Covering the matchstick head with a dough containing oxidizing material What is it?

A) potassium chlorate * b- calcium sulfate c- sodium sulfate d- sulfur

17. Identify which of the following elements are most active in nature?

A - Iron B - Gold C - Calcium * D - Copper

18. The material that gives the black color when writing with regular pencils is:

A- lead b- manganese dioxide c- granite d- soot

19. The gas that forms a fountain when it dissolves in water is:

a. N_2 b. NH_3 * c. H_2 Cl_2

20. What processes are in a dynamic equilibrium between liquid water and vapor?

A- melting and crystallization b- melting and melting c- evaporation and condensation * d- boiling and freezing



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