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*Research Article*

# The Effect Of (Ableton) And (John Zahorek) Samples On The Achievement Of Fifth-Grade Students In The Biological Field Of Chemistry And The Development Of Their Adequate Cognitive Representation

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**Abstract:** The current research aims to identify (the model effect of (Ableton) and (John Zahorek) in the achievement of fifth-grade students in the biological and development of their cognitive representation adequacy.) For the purpose of verifying this, three main hypotheses were imposed, so the researcher used the experimental method and chose Equal groups with pre and post-test, the study community consisted of students of the fifth grade of biological in the preparatory and secondary schools of the General Directorate of Karkh Education for the third academic year (2019-2020) for the purpose of applying the experiment, the study sample reached (94) students of the fifth grade of biology Three groups, two experimental and one control, as the number of the first experimental group was (30) students who studied according to the John Zahorek model, and the number of the second experimental group (30) students who studied according to the standardized method, and the number of students who studied according to the Appleton model was 34. The researcher rewarded the three research groups in a number of variables: intelligence, chronological age in months, The previous achievement, a measure of pre-cognitive representation.

The researcher prepared the necessary tools for his current study, which included an achievement test consisting of (35) objective and essay items, and a cognitive representation scale consisting of (35) items with three alternatives within (5) skills or fields, and extracted the psychometric characteristics necessary for the study tools and the researcher applied the tests. The researcher herself carried out the experiment, which took one semester to implement, and after completing the experiment, the tests were applied to the study sample for the purpose of verifying the validity of her hypotheses and after processing the data through the SPSS program, the study revealed a number of results, including the existence of statistically significant differences between The experimental and control groups in the outcome test and the cognitive representation scale for the benefit of the experimental groups and based on the results of the current study, the researcher reached a set of conclusions, including the effectiveness of the Betton model and the John Zahorek model in light of the overall achievement test and the development of the study. (Ableton and John Zahorek) on the test of achievement and development Cognitive representation in the subject of chemistry, and the inclusion of curricula for teaching methods in colleges of education in Iraqi universities are typical (Ableton and John Zahorek). The researcher suggested conducting a number of future studies.

Chapter 1

Research problem:

The problem of low achievement in chemistry and for all school levels is a common problem, and the reason for this decrease in achievement may be due to deficiencies in the methods of teaching chemistry, the most prominent of which is the use of teaching methods and strategies that depend on recitation, indoctrination and memorization only, and this is indicated by the study (Al-Rabei, 2008: 2) (Al-Janabi, 2007: 2) and (Al-Mulla, 2011: 2).

It is known that the academic achievement depends primarily on school learning, as the academic achievement represented by the monthly or final tests at the end of the school year is considered a measure to evaluate the level of the student and his educational attainment, and this can be achieved in a large proportion thanks to the methods and methods of chemistry teachers use for Provide opinions and suggestions to develop work and have the ability to plan for their future.

From the researcher's experience in supervising male and female applicants in the specialty of chemistry, as well as the opinions of a group of chemistry teachers, it was found that there is a weakness in the achievement of chemistry for the preparatory stage, especially for female students in the fifth grade, because the contents of the subject include new topics that are difficult for students to understand and grasp easily and easily.

At the present time, secondary education still depends to a large extent on the method of delivery and direction in the teaching of sciences in general and chemistry in particular, and this could be due to the inadequacy of the existence of scientific laboratories and their equipment, which results in the lack of student participation and the lack of excitement and suspense in them.
As most of the chemistry teachers adhere to the traditional teaching method based on discussing the content of the subject matter only without helping them obtain new chemical skills and information, or transfer some information to practical experiences with which they interact.
The traditional method has great effectiveness in certain situations and circumstances, but with the scientific development and the increase in the number of students in the classroom, it is no longer sufficient for the goals of learning, which led to poor achievement.
In view of the development of the science of chemistry radically, extensively and at the global level, in order to keep pace with the great development that occurred in our life where the amount of scientific, laboratory, technical knowledge and others has developed significantly, and this is something that made the average person seek to develop his abilities and scientific skills and to be able to adapt to the new developments That you encounter in his daily life.

Second: The importance and necessity of research:
The role of the teacher in it is not only to convey information and indoctrinate the student to learn the initial concepts of building comprehensive comprehensive pictures between the parts of the subject, but rather to guide and guide the student's knowledge-building processes (Al-Asadi and Muhammad, 2015: 136) and this is the basic idea of the constructivist theory that has expanded interest in its ability to increase The effectiveness of teaching, and in the development and teaching of thinking due to its wide importance in the lives of people and educators, they are not merely passive recipients and present the solutions presented and ready by him, but rather they must be helped to find the necessary solutions to their problems and avoid the dangers and predict them through inference, analysis and intellectual interaction with the environment. For the progress of man towards the desired change (Kazem, 2018: 10). To develop daily practices, and to achieve increased productivity of learners and their ability to think and solve problems. (Jaber, 2010: 27) Among these structural models are (the Ableton and John Zahorek models), the Ableton model is a relatively modern model that helps the student to become more interactive and to be in contact with the curriculum and his previous experience. Part of the community system provides its members with the capabilities that develop their capabilities and competencies to face changes in life (Al-Sanea, 2003: 36) as well as the student who is discovering what he learns through the practice of thinking that leads to the production of new knowledge and information and creates opportunities for progress, advancement, an element and a demand Basically, he discovers or rediscovers knowledge on his own (Abu Azra, 2012: 155).
As for the structural model (John Zahorek), it is based on providing information in its entirety, then presenting its parts and the necessity of coherence and refinement of information and concepts through application procedures and that discovering individual differences achieves the desired understanding of the information and the researcher's thinking processes are consistent with the development of modern education goals. The mentality to transform the individual from a consumer of knowledge into a generator of it. (Al-Qaisi, 2019, 94).
The researcher believes that it requires the teacher to renew his strategies in light of his experiences and the capabilities available to him, and that the successful method is the tool that transmits knowledge and knowledge, so whenever it is appropriate, the educational goals achieved through it are wide and more useful.
The goal of the educational process is not limited only to providing learners with knowledge, facts, and scientific theories, but rather to stimulating and activating their ability to think, and mastering their knowledge on the well-being of many concepts and concepts.
• The importance of both (Ableton) and (John Zahorek) models, because they are important modern construction models.
• The importance of the cognitive representation variable because it relates to how information is handled and how it is processed.
• The importance of the fifth stage of biological life as it is a preparation stage for the sixth grade of the biological.
• The importance of chemistry as one of the basic scientific subjects.
Third: The aim of the research
The current research aims to identify the effect of (Ableton) and (John Zahorek) models in the collection of fifth grade students in biology and the development of the adequacy of their cognitive representation.
Fifthly: Research Limits:
• Objective limits: The first three chapters of the textbook of chemistry prescribed for students of the fifth grade, biological.

• Human Limits: Female students of the fifth grade of biology for the 2019-2020 academic year.
• Potential limits: Al-Karkh three schools.
Sixth: Defining terms:
Ableton Model: It is defined as:
- It is the model that is based on the sources of constructivism theory, especially Piaget's vision of compatibility and imbalance, and the views of "Claxton and Howard" on how to adapt between previous and subsequent experiences within the individual's cognitive system, especially the scholastic experiences based on Vygotsky's social theory, which makes the teaching model effective in Vygotsky's theory. Al-Banai "(Attia 2015: 345).
Theoretical background
Appleton model:
Ableton, an educational theorist at the Royal University of Australia, "Ken Appleton" devised an educational model called (the Ableton model) or the so-called structural analysis model, in which he relied on three structural sources represented in the "Piaget" theory on developmental psychology, and the works of Howard and " Claxton in cognitive psychology, then Oluken in social constructivism
a. The stages of the Ableton Building Model are as follows:
• Sorting out the ideas in the learner's possession. This stage represents the starting point in the constructive currents who see that the new learning is based on previous learning, by diagnosing the ideas that the learners have and sorting them before starting to present the content. Among the methods that are used in this stage of classifying the ideas of the teacher: they are concept maps, interview or exploratory questions, and in light of the learners' answers, experiences are organized in the form of ideas and cognitive systems that can be referred to when interpreting the new events and experiences that are presented to them, then give a comprehensive idea of a vision That scholar of the scientist and how he interpreted the events of that science and the behavior that he practiced.
• Information processing, and at this stage the teacher tries to determine the best appropriate interpretation for him that he can use. The information processing can take several forms such as: focusing on the physical aspects of the event or situation, more than an abstract or a comparison, or linking to information, or using different information. New, experiments ... and the like, and as soon as the individual processes the information, there are three possibilities: Either a new form of information is formed that completely matches the existing idea, creating a state of satisfaction with the student, or a partial match or cognitive conflict occurs. This cognitive conflict and incompatibility between what is in the cognitive system of the learner and the new learning leads to a state of cognitive conflict that makes the operator active in search of what saves him from the state of this cognitive conflict, which leads to his acceptance of the new knowledge and new works.

Prospecting for information: At this stage, the teacher is seen as one of the sources of information and not the main source of it, and he works to organize the learning environment, guidance and counseling. And encouraging Sanda to push for the search for the answer by providing the learners with the search keys, as the teachers who were not able to provide complete answers about the situation need the so-called scaffolding that is the hints or plucking of information that helps them in the process of reaching the full answers through research And the required exploration that they are looking for or they are intended to achieve. The scaffold, as Brunner and Vygotsky call it, is a process by which the teacher is assisted in solving a specific problem, surpassing his cognitive abilities through the help of a teacher or an experienced and more advanced colleague. This exploration process, as seen by the model designer, is carried out by more than one method, including the practical presentations provided by the model. Or his ideas, including the educational materials available in the learning environment, including the ideas of other teachers and colleagues, and these sources are used based on the social context of teaching and learning that constructivism sees. In other words, this is done through multiple sources, including what the teacher offers in terms of practical presentations, or through what is stated in other books or available audio-visual means, or through the teacher's ideas, experts on the subject, ideas of colleagues, or other lessons.

• Societal context, and this stage is based on the scaffolding of learning or auxiliary performance that learners receive from the teacher in order to reach the maximum possible level of knowledge, skill, or emotional growth within the space of possible growth. Which represents the societal context of the lesson and links the content with what includes the subject and the topic, including the facts and ideas related to it, concepts, principles, skills, attitudes and values of the science of reality, and the educational scaffolding tools contribute to an effective role in teaching the subject matter and learning it to students when they ask for help from the students and take multiple assignments. Including: verbal hints (or indicative): such as the use of words such as when, where, how, and the use of similar ideas in the memory or by observing the manifestations of the educational situation, the use of computers and various media, models, models,

educational cards and learning by practical experience. The preceding and succeeding in the teacher's social environment (societal context) (Attia, 2015: 347) .. (Al-Ajrash, 2013: 53-54)

John Zahorek Model:

This model was invented by John Zahorek, and Zahorik's model derived his philosophy from the constructivist theory, and proceeded from it and based his vision for knowledge that it is not a collection of facts, concepts or laws waiting to be discovered. Rather, it is a process of building and constructing knowledge, that is, it is an attempt by students to present them with meaning and meaning. This model consists of several steps, respectively, (Yassin and Zainab, 2012: 114-115) (Zayer and others, 2017: 436-348). They are as follows:

• Information activation: new information and previous knowledge are tested. It must be provoked or adopted before the new information is given.

• Information acquisition: In this step, the teacher introduces the new information in its entirety, not as parts, for example when teaching the skill of listening, we need in this step to present it as a skill that has complete elements in general, without specifying its sub-skills and indicators indicating each skill. It is presented holistically without a precise breakdown of its indicators. Next step to this one. In this step, the teacher also provides his students with many activities and related trainings. So that they can face the new information openly, they meet with cooperative groups to solve the problem or solve activities and training.

• Use of information: In this stage, the student is given the full opportunity to work on employing what she has learned to solve the problem or new situation. The new cognitive structures that she learned are refined.

Chapter III

Research methodology and procedures:

Determining the research method: The researcher used the experimental method because it is the appropriate method for research procedures and scientifically reaching results.

First: Experimental Design:

The researcher used the experimental design with partial tuning appropriate to the research conditions, so the design came as follows:

| Telemetry | The dependent variable | The independent variable | Pre-analogy | The group |
|---|---|---|---|---|
| **Achievement Test Cognitive Representation Scale** | The outcome | Ableton model | **Cognitive Representation Scale** | First experiment |
| | | John Zahorek model | | Secondary experiment |
| | | traditional way | | **Control** |

Figure No. (1) the experimental design of the research

Second: Research Society and Sample:

The researcher chose two divisions from Al-Duha High School because it contains two divisions (A) and (B) for the fifth grade of Biology, and Khawla Bint Al-Azwar High School to represent the control group, because it contains one division.

And no female student was excluded because there were no female students who had failed in the three groups, so the final number of the sample members would be (94) female students.

Third: Equal Groups:

1- Chronological age calculated in months: The ages were calculated in months and after treating them with the statistical program, the results indicated that the research groups were equivalent in the chronological age as in Table (1).

Table (1) the results of the analysis of covariance for the ages of students of the research groups

| sign | F tabular | F calculate | The average of the squares | Degree of free | The sum of the squares | Source of covariance |
|---|---|---|---|---|---|---|
| Not sign | 3,20 | 0.112 | 5.577 | 2 | 11.153 | Between the groups |
| | | | 49.585 | 91 | 4512.251 | Within the groups |
| | | | | 93 | 4523.404 | total |

2- IQ test scores: The researcher applied the raven sequential matrix test to the students of the research groups because of its suitability to their level, and the results indicated the equivalence of the groups in the IQ test, and Table (2)

Table (2) the results of the single covariance analysis of the research groups students in the IQ test

| sign | F tabular | F calculate | The average of the squares | Degree of free | The sum of the squares | Source of covariance |
|---|---|---|---|---|---|---|
| Not sign | 3,20 | 0,259 | 1,735 | 2 | 4,471 | Between the groups |
| | | | 6,710 | 91 | 610,582 | Within the groups |
| | | | | 93 | 614,053 | total |

3- Final grade in chemistry for the previous academic year: the researcher obtained the information required for the members of the research sample for the final grade of the school cards for the students of the three groups with the help of the school administration. Table (3) illustrates this.

Table (3) the results of the covariance analysis for the degree of chemistry in the previous academic year

| sign | F tabular | F calculate | The average of the squares | Degree of free | The sum of the squares | Source of covariance |
|---|---|---|---|---|---|---|
| Not sign | 3,20 | 0,049 | 9,169 | 2 | 18,338 | Between the groups |
| | | | 52,95 | 91 | 4815,716 | Within the groups |
| | | | | 93 | 4834,053 | total |

4- The degrees of the cognitive representation scale: The researcher applied the cognitive representation scale to the students of the research groups because of its suitability for their level, and the results indicated the equality of groups in the cognitive representation scale, and Table (4)

Table (4) the results of the single covariance analysis of the research groups students in the cognitive representation scale

| sign | F tabular | F calculate | The average of the squares | Degree of free | The sum of the squares | Source of covariance |
|---|---|---|---|---|---|---|
| Not sign | 3,20 | 0,981 | 10,214 | 2 | 20,428 | Between the groups |
| | | | 10,415 | 91 | 947,784 | Within the groups |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | 93 | 968,213 | total |

Fourth: Controlling non-experimental (extraneous) variables:
The researcher tried as much as possible to control some non-experimental (extraneous) variables that she thinks affect the safety of the experiment, because controlling them leads to accurate results, namely:
Selection of the sample: the researcher worked as much as possible to control the differences between the students of the research groups by randomly selecting the sample, as well as the procedures of the statistical parity process in a number of variables whose interactions with the independent variables could have an impact on the dependent variables, in addition to the fact that the students belong to a similar socio-economic environment. Almost.
The conditions of the experiment and the accompanying accidents: they mean the accidents that may occur during the experiment and that impede the course of the experiment, such as: (floods, roadblocks, curfews and other emergency conditions that impede the workflow of the experiment).
Experimental extinction: The current research has not exposed such cases,
Maturity factor: This factor had no effect in the current research, because the duration of the experiment was limited and standardized for the experimental and control groups.
Measurement tool: The researcher used the same tools at the same time, as she used a standardized achievement test in the subject of chemistry, and the cognitive representation scale among the students of the three research groups.
Subject: The three groups studied the same subject in the chemistry textbook

The classroom environment: The researcher applied the experiment in classes that are similar to some kind of design, and the number of students, class size, capacity, lighting, ventilation, number and size of seats, and the social environment are close.
Fifth: Research Requirements:
- Determining the scientific subject: The researcher has specified the scientific subject that she will teach to the students of the experimental and control research groups during the experiment, which are the topics included in the three chapters of the book of chemistry for the academic year 2019-2020
Formulation of behavioral goals: The researcher formulated behavioral objectives for the subject, totaling (257) behavioral objectives distributed within (6) levels (knowledge, understanding, application, analysis, structure, evaluation), and they were presented to a group of referees in the field of teaching methods and chemistry. All behavioral purposes obtained the approval of the arbitrators.
Sixth: Research Tools:
1- The Final Exam:
3- Preparing the test map (table of specifications):
The researcher prepared the test map, which was as follows
Table (5) the test map for the outcome test

| **total** | **Percentage of behavioral purposes** | | | | | | **Content percentage** | |
|---|---|---|---|---|---|---|---|---|
| **%100** | **Evaluation %8** | **Installation %10** | **analyses %10** | **application %12** | **understand %30** | **remember %30** | **important** | **unit** |
| 13 | 1 | 2 | 2 | 2 | 3 | 3 | %38 | **1** |
| 9 | 1 | 1 | 1 | 2 | 2 | 2 | %24 | **2** |
| 13 | 1 | 2 | 2 | 2 | 3 | 3 | %38 | **3** |
| 35 | 3 | 5 | 5 | 6 | 8 | 8 | %100 | **total** |

The final image of the test: The final outcome of the test consists of (35) items of the multiple choice type, filling in the blanks and essay paragraphs.
Cognitive Representation Scale

The current research requires building a scale for the cognitive representation of fifth-grade students in the biological category, so the following steps were followed:
1. Access to literature and previous studies: The researcher reviewed several studies that dealt with cognitive representation, including one (Abd Al-Hussein, 2010).
2. Determining the skills of cognitive representation: The researcher identified five skills for cognitive representation, which are: (retention skill, meaning skill, connection skill, the derivation skill, synthesis).
3. Formulating the paragraphs of the Cognitive Representation Scale in its initial form:

After the researcher reviewed a number of local, Arab and foreign literature, research and studies related to cognitive representation, I prepared a scale in its initial form consisting of (35) paragraphs, and in front of each paragraph there are three alternatives (always, sometimes, rarely). The paragraphs were distributed on the five literal representation skills. (7) Paragraphs for each skill.
4. The validity of the cognitive representation scale: The apparent validity of the scale has been verified, as it has been verified by presenting the scale in its initial form to a group of specialists in educational sciences, teaching methods, psychology, measurement and evaluation, in order to express their opinions, remarks, or evaluation of the scale What they see is not appropriate, and the researcher has accepted the paragraph that has an approval rating (80% or more), so all the paragraphs got approval and no paragraph was deleted.
5. The exploratory application of the cognitive representation scale: To ensure the clarity of the instructions for answering the scale, and understanding the paragraphs, the researcher applied it to an exploratory sample consisting of (50) students of the fifth grade of biology, and it was found that all the paragraphs of the scale about it and the instructions In order to control the time taken to answer the test items, the completion time of all the students' answers was monitored, and the average time was (34) minutes
Paragraph discrimination coefficient ranged between (4.03 - 9.81), as the paragraph is considered good if its discriminant strength factor is greater than the tabular T value of (2.00) at the level of significance (0.05) and the degree of freedom (52);
The relationship of the paragraph score to the total degree of the scale: The relationship of each paragraph's score to the total degree of the scale was calculated, using the Pearson correlation coefficient, and the values of the Pearson correlation coefficient ranged between (0,27 - 0,58), and to ensure the statistical significance of the correlation factors, the researcher converted the values The correlation coefficients for the corresponding T-values, and the calculated T values ranged between (2.78 - 7.05), which is greater than the tabular T value of (1.98) at the level of significance (0.05) and the degree of freedom (98).
Consistency: The researcher reached (0.88) by using the grades of the statistical analysis sample for the paragraphs of (100) female students. Thus, the scale became in its final form, which consists of (35) items distributed into (5) domains: (preservation, meaning, linkage, derivation, synthesis) with (7) items for each field.
Seventh: Implementing the experiment: The experiment started on Sunday 10/13/2019 and ended on Wednesday 1/22/2020, as follows:
1- The first group studied the experiment according to the Ableton model.
2- The group studied the secondary experiment according to the John Zahorek model.
3- The control group studied according to the usual method.

The fourth chapter
First: Presentation of results:
A: The results of the first main hypothesis:
Table (6) the arithmetic mean and standard deviation of scores for students of research groups in the outcome test

| Standard deviation | SMA | No. of student | The experimental group |
|---|---|---|---|
| 3,44 | 49,30 | 30 | The first (Ableton model) |
| 3,89 | 50,03 | 30 | High School (John Zahorek) |
| 2,36 | 42,47 | 34 | Third (control) |

In order to know the significance of the statistical differences, Table (7) explains that.
Table (7) the results of the analysis of monovision of students' scores for the research groups

| Sign level | F - value | Average of | Degree of | The sum of | Source of |
|---|---|---|---|---|---|

| | tabular | calculate | | | | |
|---|---|---|---|---|---|---|
| sign | 3,20 | 53,33 | 565,94 | 2 | 1131,88 | Between groups |
| | | | 10,61 | 91 | 965,74 | Within groups |
| | | | | 93 | 2097,62 | Total |

In order to reveal the direction of the differences, the researcher used a chef test, and the results were as in Table (8) as follows:

Table (8) Sheffet test to analyze covariance of the grades of the research groups in the results

| The control group | The second experimental group | The first experimental group | group |
|---|---|---|---|
| 46,99 | 0,45 | - | The first experimental group |
| 42,97 | - | - | Secondary experimental group |
| - | - | - | The control group |

, And there were no differences between the first experimental group and the secondary experimental group.

2- The results of the secondary main hypothesis: the researcher calculated the mean scores of the students and their standard deviations in the research groups in the cognitive representation scale, and Table (9) illustrates this.

Table (9) the arithmetic mean and the standard deviation of the scores of students of the research groups in the scale of cognitive representation

| Standard deviation | SMA | No. of student | The group |
|---|---|---|---|
| 3,334 | 85,700 | 30 | First experiment (Ableton) |
| 3,439 | 87,033 | 30 | Secondary experimentation (John Zahorek |
| 1,919 | 76,118 | 34 | The third group (control) |

In order to know the significance of the statistical differences between the averages of the scores of the three research groups' students in the cognitive representation scale, the researcher used the analysis of unilateral covariance and Table (10) illustrates this.

Table (10) the results of the analysis of unilateral covariance of students' scores for research groups in the Cognitive Representation Scale

| Sign level | n - value | | Average of square | Degree of free | The sum of square | Source of covariance |
|---|---|---|---|---|---|---|
| | tabular | calculate | | | | |
| sign | 3,20 | 133,373 | 1153,155 | 2 | 2306,310 | Between groups |
| | | | 8,646 | 91 | 786,796 | Within groups |
| | | | | 93 | 3093,106 | Total |

From the above table, we find that the calculated F value is greater than the tabular F value, and this means that there is a significant difference between the three groups.

In order to reveal the direction of the differences, the researcher used a Shafe test, and the results were as in Table (11) as follows:

Table (11) Shave's test to analyze covariance of the grades of research groups' students in the scale of cognitive representation

| The control group | The second experimental group | The first experimental group | The group |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 84,62 | 1,54 | - | The first experimental group |
| 109,805 | - | - | Secondary experimental group |
| - | - | - | The control group |

Through the above table, it is clear that there are differences between the first experimental group and the control group, and between the secondary experimental group and the control group, and there were no differences between the first experimental group and the secondary experimental group.

C- The results of the third main hypothesis: The researcher calculated the averages of the students 'grades and their standard deviations in the research groups in the cognitive representation scale, and Table (12) illustrates this.

Table (12) the arithmetic mean and standard deviation of the scores of students of research groups in the development of cognitive representation

| Standard deviation | SMA | No. of student | The group |
|---|---|---|---|
| 5,55 | 10,00 | 30 | First experiment (Ableton) |
| 5,28 | 11,20 | 30 | Secondary experimentation (John Zahorek |
| 0,67 | 1,26 | 34 | The third group (control) |

In order to find out the significance of the statistical differences between the averages of the scores of the students of the three research groups in the cognitive representation scale, the researcher used a single covariance analysis and Table (13) illustrates this.

Table (13) the results of the analysis of unilateral covariance of students' scores for research groups in the development of cognitive representation

| Sign level | n - value | | Average of square | Degree of free | The sum of square | Source of covariance |
|---|---|---|---|---|---|---|
| | tabular | calculate | | | | |
| sign | 3,20 | 50,68 | 956,45 | 2 | 1912,89 | Between groups |
| | | | 18,87 | 91 | 1717,42 | Within groups |
| | | | | 93 | 3630,31 | Total |

From the above table, we find that the calculated F value is greater than the tabular F value, and this means that there is a significant difference between the three groups.

In order to reveal the direction of the differences, the researcher used a chef test, and the results were as in Table (14) as follows:

Table (14) Shaveh test to analyze covariance of the grades of research groups' students in the scale of cognitive representation

| The control group | The second experimental group | The first experimental group | The group |
|---|---|---|---|
| 32,56 | 0,75 | - | The first experimental group |
| 41,72 | - | - | Secondary experimental group |
| - | - | - | The control group |

Through the above table it is evident that there are differences between the first experimental group and the control group, and between the secondary experimental group and the control group, and there were no differences between the first experimental group and the secondary experimental group.

Second: Interpretation of the results:

1- Female students are taught using the (Ableton) model in groups that are divided on the basis of their abilities, intelligence, aptitudes and tendencies, which provides them with a good environment for education.
- Teaching using the John Appleton model increases the opportunity for cooperation between students of one group and competition with other groups, thus allowing students with low achievement to mix and benefit from their more knowledgeable colleagues and thus have a desire to learn and learn from others.
- When teaching using the Ableton model, the teacher can take into account individual differences between students and increase the opportunity for cooperation among them. There is cooperation and individual and collective responsibility between group members in learning and mastering information in addition to the discussion and exchange of opinions and ideas between the group students, and giving the student enough time. For learning, all of this helps in increasing the academic achievement of the students of the experimental group, compared with their colleagues in the control group.
2- The results of the current research resulted in the superiority of the female students of the experimental secondary group who study chemistry using the model (John Zahorek) over their colleagues in the control group who studied in the usual way.
We can attribute the reason for this superiority to the following reasons:
- The use of John Zahorek's model increases students' ability to interact with each other and with the educational situation through the ease of retrieving information and obtaining the necessary assistance from their colleagues or from the school or any other person with experience in the subject of the lesson and thus have a positive role in the educational process.
- (John Zahorek) model puts the student in a real confrontation with the educational attitude, which allows him to build learning by himself, which broadens his perceptions and thus can determine whether she can pass the learning process on his own or if he needs the support and help of others, achieves the model (John Zahorek) In this case, it is a kind of suspense, attracting attention, and exciting students to think better, and then the student comes out with a collection of ordered information that remains in memory for the longest possible period.
Teaching using the John Zahorek model increases the opportunity for continuous and effective communication between the student and the school on the one hand, and between the student and his colleague on the other hand, so that through this interaction the teacher can stand up to the needs of the multiple students and encourage them to take responsibility for self-learning, and the teacher provides The information for students in an educational environment rich with experiences of various trends, feelings and tendencies, which drives them to achieve the desired educational goal to be achieved.
Teaching using a model (John Zahorek) provides the student with the opportunity to present academic concepts in a way that differs from the traditional method of teaching, which depends entirely on the teacher and thus works to improve his cognitive abilities, gives him a sense of acceptance from others and confidence in himself, and allows the teacher to overcome the problem of the number of students In the same classroom and the individual differences between them, which adds an amount of suspense, excitement and freedom to the student and reduces boredom and routine.
Third: Conclusions:
1. The use of the two models (Ableton and John Zahorek) has an effective role in increasing the fifth grade students 'biological achievement in chemistry, and they contribute to the development of students' cognitive representation.
2. The use of the two models (Ableton and John Zahorek) emphasizes the positive role of the student because it is the main focus in the educational educational process through the active participation of all students in the lesson.
3. It has not been proven that the preference of either of the two models over the other in increasing the achievement of the fifth-grade students in the biological field in chemistry and their cognitive representation has not been proven.
Fourth: Recommendations:
1. Emphasis on male and female teachers using models (Ableton and John Zahorek) in teaching chemistry, for their effectiveness in developing outcomes, and for their importance in developing students' cognitive representation.
2. The necessity to include the two models (Ableton and John Zahorek), within the vocabulary of the content of the teaching methods course in the Faculties of Education, with an indication of their most important features and the steps for their implementation.
3. The necessity of acquainting and training the educational specialists and supervisors on the structural models. In their turn, they train male and female male and female teachers on how to prepare and use them through developing development courses and their participation in them during their educational service.
Fifth: The proposals: In light of the results of the research, the researcher can suggest the following future studies:
1- A comparative study between the two models (Ableton and John Zahorek) in other educational variables, such as types of thinking or attitudes.
2- Comparing one of these two models with other teaching models.

3- A comparative study between the two models in other subjects.
4- A comparative study between the two models in other educational stages.

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