

## The Structure Of Chemical Concepts Among Students Of The Faculty Of Education Of Pure Sciences / Ibn Al-Haitham

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**Abstract:** The current research aims to identify the structure of chemical concepts in the students of the Faculty of Education of Pure Sciences / Ibn al-Haytham and used the descriptive method, to suit the nature of the research goal and to verify this was built testing the structure of chemical concepts consisting of (12) conceptual paragraphs (map) distributed to four questions analyzed data and statistically treated using (t-test) for two independent samples, equivalent Cooper, difficulty coefficient equation, discrimination coefficient equation, Pearson correlation coefficient, Quidor and Richardson equation (20), alpha-Cronbach equation, and the following results were reached: the level of performance of fourth-graders - chemistry department in the Faculty of Education for Pure Sciences / Ibn Al-Haytham was high in testing the structure of chemical concepts, and there are no statistical function differences attributable to the sex variable in the test of the structure of chemical concepts.

**Keywords:** Chemical Concept Structure, Faculty of Education for Pure Sciences, Ibn al-Haitham

### Chapter 1

(Definition of Research)

#### Research question

Based on the need to arm the student teacher in the 21st century before he engages in the actual field of work in all means of learning and modern education, it is necessary to study and measure the extent of the integration of his chemical conceptual structure, it is a necessary queen for every capable chemist to take his students on a journey to discover the secrets of chemistry and atoms and their basic concepts, and the problem of research lies in revealing the structure of chemical concepts among students in the department of chemistry in order to recognize the level of the structure of their chemical concepts, especially as they are on the threshold of entering into Practical life, and interest in them in general and the segment of the creators in particular, the studies addressed the variable structure of chemical concepts as a variable of one of the strategies as in the study (Mashkur, 2006) and (Abdullah And Samaya, 2013), but at the local level we mention the study (Abdul Karim, 2014) addressed the variable of the structure of concepts as an independent variable, hence the need to answer the problem of research which was the answer to the following question:

**What is the structure of chemical concepts among students of the Faculty of Education for Pure Sciences/Ibn al-Haitham?**

#### The importance of research:

The conceptual construction of the learner is one of the main factors affecting the effectiveness of learning, as the learner's possession of a conceptual knowledge structure enables him to act with knowledge and alter it and generate new knowledge of it, or to establish new relationships between its elements. The structure of concepts facilitates acquisition and retention of the learner, and concept maps are used to investigate the conceptual structure that learners have in the cognitive subject, showing how cohesive and integrated the structure is and uses a way to evaluate the learner's performance and confirm learning (Abdul Karim 2014: 4).

#### The importance of research.

1-Proposes a solution to summarize chemical concepts in chemistry courses in the initial university stages in the faculties of education and increase the ability of students to remember these concepts in a meaningful way, by summarizing these concepts in a system of conceptual maps.

2-Provides a tool to detect the level of structure of chemical concepts in the students of the fourth stage - department of chemistry in the Faculty of Education of Pure Sciences / Ibn al-Haytham.

#### Research objectives: Search is guided to:

1-Identifying the structure of chemical concepts among students of the fourth stage Department of Chemistry in the Faculty of Education of Pure Sciences / Ibn al-Haytham.

2-Identifying the differences of statistical significance in the structure of the chemical concepts of students of the Faculty of Education of Pure Sciences/ Ibn al-Haytham depending on the sex variable.

**Search limits:**

Human Boundaries: Fourth-stage students - Department of Chemistry (Morning, Evening) at the Faculty of Education for Pure Sciences/ Ibn al-Haytham

-Physical boundaries: courses of chemistry (organic, inorganic, analytical, life, industrial, physiological) for the first three stages of the department of chemistry in the Faculty of Education Ibn al-Haytham Definition of terms.

**Structure of chemical concepts: known by both.**

Conant, 1973): "A coherent hypothetical pattern of basic, secondary and sub-concepts, illustrating these concepts, and their relationships in a particular scientific field, as well as providing a planning summary of what has been learned and reflecting the extent to which an individual can scientific material and awareness of its interconnections" (Conant, 1973:49-51).

-(Rana Karim Abdul Karim, 2014): "A network of consistently regular basic, secondary and tub chemical concepts shows the relationships that bind these concepts to one of the necessary links" (Abdul Karim, 2014:8).

## Chapter 2

### (Theoretical Framework)

Ozil's theory :

Organizer Advanced is one of the theories of cognitive learning. Ozil explained how individuals learned the readable and spoken verbal material, and Ozbel's theory was interested in analyzing the subject into its primary elements to understand and understand the relationships between these elements. Osbel's theory is based on the subsumption of knowledge, where information is stored in the learner's memory and accumulates hierarchically from more general ideas to less general ideas, and so on. The learner thus builds knowledge links to link his new information to be learned with his previous information, leading the learner to understand and understand the information in a meaningful way (Meaningful Learning) (Abu Riach, 2007:117).

The organizer: It is a set of concepts, generalizations, or rules in a topic or a specialty of what is characterized by its seriousness provided to students at the beginning of educational situations to help them a link and tab the information in their knowledge buildings. Ozil divides it into:

Advanced organizations

Advanced organizations to compare

Advanced pictorial organizations

In line with the current subject of research, advanced pictorial organizations include concepts, texts, information, and their relationships with bodies and forms. (Abdul Karim, 2014: 14-15)

**Structure of cafes:**

The conceptual structure is part of the cognitive structure of the individual, as we mean by the cognitive structure as the knowledge represented by the set of facts, concepts, issues, and cognitive data available to the learner. To achieve complementarity in the structure of concepts in the student-teacher, he must achieve the results:

1-Having an integrated concept structure for the concepts that he is expected to present to his students.

2-His good knowledge of the structure of general concepts of the curriculum, as well as his precise knowledge of the structure of concepts for lessons, whether independent or combined.

3-Knowledge of the realized conceptual buildings owned by his students in the form of their knowledge stock. (Qatami and Mohammed, 2005: 27)

A set of methods used to diagnose the conceptual structure of teachers and learners, and scheme (1) illustrates those methods:

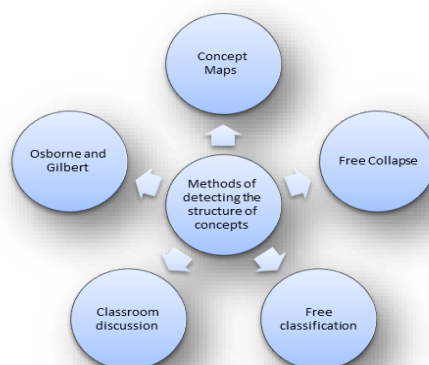


Chart (1) Methods of diagnosing the structure of concepts

The concept mapping method has been chosen to identify the structure of concepts in this research.

Concept maps are made up of

-**Scientific concept:** it is a mental building that results from the common qualities of the phenomenon of mental perceptions that the individual has of things, and explains the concept within a form of an oval, circular, square, or rectangular geometric.

**Binding words:** used to link two or more concepts divided into, from, their formula .-

-**Crosslinks:** it is a link between two or more concepts in the form of an occasional horizontal line.

-**Examples:** events or sharp acts that express examples of concepts and are often (name of science) (Sharif, 2011: 71).

### Chapter 3

#### Research approach and procedures:

##### First: Research method:-

In the current research, use the descriptive search method to suit the nature and objectives of the research.

##### Second: Research community

The current research community is represented by all students of the fourth stage - department of chemistry in the Faculty of Education of Pure Sciences / Ibn al-Haytham for morning and evening study at Baghdad University. The researchers used the study of the Department of Chemistry in the Faculty of Education for Pure Sciences /Ibn al-Haitham to find out the number of students in the fourth stage (male and female) in it for the academic year (2020-2021), where the total student (167) of them (130) males and (137) females. • Third: Research sample:

The two researchers randomly selected the research sample and the number of research sample members (150) students representing 59% of the research community.

Fourth: Research tool: stages of building paragraphs testing the structure of chemical concepts:

##### a) Determining the goal of testing the structure of chemical concepts:

Identify the structure of chemical concepts for fourth-stage students - Department of Chemistry in the Faculty of Education of Pure Sciences / Ibn al-Haytham.

##### b) Content analysis:

The content of the courses (organic, inorganic, analytical, life, physiological, industrial) that are taught for the first, second, and third stages of the Faculty of Education of Pure Sciences/ Ibn al-Haitham, was analyzed to pre-establish concepts at all levels, letters, binding words and examples contained in them.

c) Identify and arrange relationships between concepts according to their importance to:

Key concepts and sub-concepts (first level, second level... Etc.

w) Build a variety of conceptual maps using concepts, binding words, and examples :

c) Preparing questions to test the structure of chemical concepts

Table (16)

Number and ratios of concepts per subject (competence)

Number of maps (paragraphs) per article	Percentage of concepts in each subject	Number of concepts	Number of maps The total for each subject	Subject
4	4.4	443	27	Inorganic
2	1.5	151	13	Organic
2	1.9	193	15	Analytical
2	1.9	196	10	Biochemistry
1	1.3	136	8	Industrial
1	0.8	81	7	Physical
12		1200	70	Total

h) Test instructions

e) Instructions to correct questions testing the structure of chemical concepts

Thus, the overall degree of testing paragraphs of the structure of chemical concepts is determined by the range (0-150).

d) Reconnaissance application to test the structure of chemical concepts

To verify the clarity of the paragraphs of the test of the structure of chemical concepts and the clarity of his instructions and the time needed to answer it, the test was applied in the initial form of 15/12/2020 to 20

students of the fourth stage - department of chemistry in the Faculty of Education of Pure Sciences / Ibn al-Haitham from the research community and not who appointed him, and it became clear from the application that most of the paragraphs are understandable and clear. The average time to answer the test was (45) minutes by recording the timing to deliver the first paper after the passage of (30 minutes) and the last paper after the passage 60 minutes). .(

$$30 + 60 = 90$$

$$90/2 = 45$$

y) Statistical analysis of chemical concept structure testing paragraphs: (difficulty and ease factor for paragraphs, discrimination laboratory, honesty (internal consistency), test stability.(

**Description of the chemical concept structure test as finalized:-**

The chemical concept structure test consists of (4) key questions and each question contains a set of paragraphs in the type of pan test with the highest possible degree of correction (12) degrees and a potential low score (zero). Except for the paragraphs of the fourth question, the highest possible degree of correction (15) and the lowest possible score (zero). Therefore, the highest test score is (150), the lowest score (zero), and the hypothetical medium of the testis (75).

Sixth: Statistical means: The researcher used the computer program (SPSS) to analyze the data and reach the results of the research.

## Chapter 4

### View and interpret search results

To achieve the research objectives, the two researchers applied the chemical concept structure test to the research sample consisting of (150) students. The results of the research showed that the mathematical average of the grades of this sample on the test was (88,620) degrees and with a standard deviation of (22,935) degrees, and to know the indication of the difference between the mathematical average and the hypothetical average of (75) degrees, the researcher used the t-test of one sample The difference was found to be statistically significant at 0.05, with the

calculated T value (7,273), which was higher than the table T value of 1.96, and freely (149), meaning that the research sample possessed a high level of chemical concept structure. To identify statistically significant differences in the structure of concepts, the researcher took the responses of the 150-student research sample to test the structure of chemical concepts, After statistically processing the data, the researcher extracted the average sample score on the test by gender (male and female), and found that the average male score (89,203) with a standard deviation of (23,491), and the average female score (88,186) with a standard deviation of (22,641) and to identify differences between males and females, the researcher used the meta-test for two independent samples. The lack of statistically significant differences between males and females in the structure of chemical concepts is that the calculated T value (0,268) is smaller than the table T value of 1.96 at the level of indication (0.05) and the degree of freedom (148). Interpret search results:

The results of the research show students of the Faculty of Education of Pure Sciences Ibn al-Haytham have a high concept structure (very coherent). This means the ability of specialized individuals to activate their conceptual builders and this is consistent with (Zoubi Study, 1992). The results of the research showed that there are no statistically significant differences attributable to the sex variable (female and male) of the structure of chemical concepts because the study stage reached by the students, which is the fourth stage in which mental abilities are completed as well as according to the fact that they are requested within one scientific specialty, which is the specialization of chemistry, so the researcher considers it natural that there are no differences between males and females.

### Conclusions:

In light of the findings of the researcher's findings, the following can be inferred:

- The level of performance of students of the Faculty of Education of Pure Sciences / Ibn al-Haytham was high in testing the structure of chemical concepts.
- There are no statistically significant differences attributable to the sex variable in the testing of the structure of chemical concepts.

In light of the results, the two researchers put forward proposals and recommendations.

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