

The Misconception among the Students of the Department of Science Faculty of Basic Education of the Concepts of Respiration and Photosynthesis in Green Plants

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Abstract

This study sheds the light on the misconception of the concepts of respiration and photosynthesis that takes place among the students of the department of science/ branch of biology, third grade faculty of basic education, while they are in a period of preparation for teaching as teachers in schools. The research sample consisted of (78) male and female students, and it represents the research community itself, with (51) female students and (27) male students. To identify the alternative concepts of the research sample. A test of the multiple-choice type related to the concept of nutrition and photosynthesis was constructed with (50) items. Validity and reliability were conducted, and the power of discrimination and the effectiveness of the alternatives related to these items were extracted. After conducting statistical analyzes, it was concluded that the usual teaching used in schools has a major role in the formation of alternative or erroneous concepts, on which the conceptual structure is built in the student's mind.

Keywords

Misunderstanding, Concept, Respiration, Photosynthesis

Chapter One

The Importance of the Research and the Need for it

Problem of the Research

Concepts are among the important elements of the content of the curriculum. Many educators have focused on teaching them in addition to principles, generalizations and theories, rather than focusing on information and facts, preserving and retrieving them. Concepts reduce the necessity of repeating the lesson. It contributes to finding solutions to some learning problems for students to move from one stage to another. What is built first is an important focal point for what comes after it.

Biology is one of the subjects that contain many concepts that must be taught correctly to students. Some of them are difficult to understand when presented in an

abstract manner, which leads to the formation of some misconceptions about biological concepts.

The mental perceptions that are built in the minds of university students of biological concepts differ according to the situations and experiences they study (Barry, 1979, p: 174). It is possible that the significance of one concept is similar to different students when the situations they go through are similar, just as we cannot say that all students reach the same level of understanding, because this is logically and scientifically not possible, so the misconception may come from previous years and stages of study that are coherent and resistant to change, because of the usual methods of teaching and the lack of use of teaching aids and experiments because they are not available in the laboratories of the department of science this is what the researcher discovered through teaching it on the practical side for several years, as evidenced by a diagnostic test that the researcher carried out at the beginning of the academic year, and its results

resulted in the weakness of the cognitive structures in the mind of the student (Nasser, 2010: 154).

A lot of literature indicates that the actual difficulty is not in learning the concept, but rather in the wrong understanding of the concept, as the learning is based on narrating information theoretically, memorizing it, lack of various exercises, and weakness in the practical side. Giving a lot of inconsistent information and failing to link related facts to each other, which generates a misconception of the concept (Al-Deeb, 1974: 112).

(Lawson, 1989) confirmed that the daily situations that the student goes through, as well as the incorrect experiences and information that are provided to him while learning and teaching the curriculum prescribed by the teacher, generates problems in comprehending and acquiring concepts correctly. (Lawson, 1989, p:825) This requires the teacher to devote additional effort and time, trying to conduct an effective correction process for these concepts and developing new and correct ones.

The study of (Ghazal and Zaidan, 2008) and (Nasser, 2010) revealed that there is a misconception among students in biology at all educational levels.

The misconception of biological concepts among these students has led to a decrease in their achievement in this subject, because concepts are an essential pillar in the collection of various subjects. It is clear from this that biology teachers do not pay tangible attention to the misconceptions of their students, as they do not use methods or models and strategies to correct what is wrong with them, so it is natural for them to remain in contact with them throughout the school stages. Therefore, the problem of this research is crystallized in the following question:

What is the level of misconception among the students of the faculty of basic education, department of science, of the concepts of respiration and structure in green plants?

The Importance of the Research and the Need for it

Biology is one of the fast-paced human sciences in terms of development in our current era, due to the fact that many of its branches, such as evolutionary biology or cellular biology, in addition to neuroscience, are undergoing great changes, and of a high degree. It has witnessed a lot of discoveries in recent years, as biology is divided into several fields, and this is based on those phenomena that scientists specialize in studying, including botany, zoology, and formal biology, which is a science that studies (the body of organisms and their members). In addition to functional biology, which studies these functions of the vital organs of every organism. (Ahmed, 2018: 87).

Photosynthesis is very important to life on Earth, as it plays a direct and indirect role in the food we eat and the

air we breathe, and in the absence of photosynthesis, the Earth's basic food supply will not be renewed.

In the scarcity of food, most living things disappear, and the planet becomes devoid of oxygen. (Saqr, 23: 2022).

It shows the importance of biological concepts and their acquisition as a basic goal of teaching biology, and it is one of the foundations of the subject that is useful in understanding its general structure and in transmitting the impact of training. Thus, the importance of biological concepts in the student's scientific and practical life increases in the face of the knowledge explosion and the increase in facts and information at a great pace. (Al-Mahjah, 2004: 76).

Educators specialized in the development of biological curricula look at biology in a hierarchical form that begins with an expanding base of facts and knowledge that are gathered and described in the light of common normative characteristics to form what is known as concepts (Al-Laqani and Al-Awdah, 1990: 162). With this modern trend of science and its curricula, the study of concepts has become one of the main pillars of biology, and its aspects are beneficial as it classifies the environment and reduces its complexity.

The concepts in educational studies and the methods of learning them took an important place among scientific education specialists because of the new developments that occurred in the fields of psychology as a result of the experimental research conducted on learning the concept and teaching it, and the resulting learning theories and modern teaching models in this field. This effect appeared in the field of Scientific education, as some researchers have directed the interest of studying concept learning models and the educational methods and strategies emanating from that in order to identify the extent of their effectiveness in teaching scientific education concepts (Saada and Jamal, 1988: 477).

Concepts are the basic building block of knowledge, and interest in them has increased at the present time more than in previous years due to the increase in knowledge and the great difficulty in knowing the aspects of one branch of them. Therefore, the teachers' concern has become to help students to comprehend and be aware of the conceptual or logical environment of the subject while leaving out the details (Maree and Al-Hila, 2002: 27).

Concepts are a good way to activate mental growth and push it forward, in addition to helping students to absorb and interpret many facts, information, and knowledge that arouse their attention in the environment in which they can respond to, i.e. learn them, and lead to an increase in students' ability to use them as the main science functions that are represented in Interpretation, evaluation and prediction (Zeitoun, 1994: 84).

It reduces the effort and time it takes in the learning process, contributes to the transmission of its impact, and

helps solve problems that contain terms or content that were not previously mentioned by the learner, and this indicates his mastery of a set of concepts properly. It is a basic rule for teaching and learning, as it is the building block of knowledge and its core, from which theories and generalizations are formed.

The focus began on learning the concepts contained in the various scientific branches of the objectives of scientific education, as it is the key to real scientific knowledge, its basis and the language of science, as it is more in line with the modern view of the nature of science and its dynamics, as it is inherent in self-learning and lifelong practical education, and then reduces to re-learning when facing situations New (The Drunk, 1989: 93).

The overcrowding of the academic content with new concepts may be a reason for not understanding it properly, especially in the higher educational stages, and the usual methods and methods such as lecture, explanation and narration are another reason for stuffing information and facts without organizing the knowledge structures or classifying the concepts and the relationships between them in the mind of the student (Haidar, 1993): 93).

Concepts with a misconception are derived from personal experience, but they are not inconsistent with or consistent with existing scientific theories. These concepts may be deep-rooted and resist learning. They also hinder the acquisition of subsequent concepts, and their modification or change requires students to pass through stages of development, generating a cognitive conflict or a state of imbalance between what is wrong and what is right. (Posner, 1982: p212).

This means that the student's acquisition of any scientific concept takes place in stages or continuous circles, and therefore any wrong experiences or scientifically inaccurate ideas he acquires during his formation inevitably lead to the formation of alternative frameworks or concepts that involve a wrong understanding of the concept in question and its implications, and what is related to it. From experiences, ideas, and other concepts later. (Al-Deeb, 1974: 83-89)

Thus, the acquisition and formation of the concept of the student requires the practice of the following mental operations:

- 1- Distinction: It means the student's ability to distinguish between interrelated elements or features Similar and dissimilar and positive examples and negative example.
- 2- Organization and Classification: It means the student's ability to organize and classify facts Observing similarities and finding relationships and general characteristics shared between the elements.
- 3- Generalization: It is when the student arrives at a general principle or rule that has the characteristic of

comprehensiveness or generalizations, i.e., generalizing the concept to other examples that apply to the concept. (Al-Ani, 1989: 30-80).

Biology is an essential part of school programs for all stages of education and an element that cannot be dispensed with its special role in life and education. Contemporary, as its teaching contributes to the development of students' mental habits as a note objectivity. And imparting to them facts and concepts from the world surrounding them, including living beings, because man himself is a living being, it is not possible for him to fully understand himself and correct his conditions with wisdom unless he realizes the nature of human life and the various factors and influences that affect his growth, as well as his interest in studying various topics, including those related to The animal in general, its environment, and its characteristics, including what is related to the plant and its characteristics, is a science that has its origins, branches, bases, roots, many tools and benefits. (Abu Zina, 1982: 3).

Given the importance of these sciences, it is necessary to identify the extent to which the student acquires concepts through the use of diagnostic tests, as it is considered a major and important tool for detecting weaknesses and determining the levels and needs of students and their abilities to accept new learning. to a wrong perception Misconception, it is due to a misconception and thus helps the teacher to determine his procedures Therapeutic and reconsidering educational attitudes and activities and planning to address deficiencies and correct their mistakes and weaknesses (Amin, 1997: 151-155).

These tests often conclude that the students, after they have finished their lessons in which they are supposed to have succeeded, show clear misconception and resort to naive ideas that are not sound to them. Everything that is built on them of simple or complex concepts will be a wrong and shaky construction. Therefore, the students' correct understanding of the concepts students of all ages and learning levels require methods of teaching that ensure the integrity of this understanding and its retention and reduce misconception. (Raif, 1987: 11) (Zeitoun, 1994: 85)

Due to the importance of the subject of misconception of concepts, seminars and conferences were held, most notably the conference dedicated to discussing misconception in science and mathematics, which was held at Cornell University in 1983. The conference focused on misconceptions in terms of analysis, interpretation and formation. (Al-Shahrani, 1996:10) and in the educational conference held in Spain (1992) at the Arab Center for Scientific Research and documentaries and the calendar presented a study aimed at how to identify thoughts other than the correctness of the students and the methods of treatment or correction by

teachers using scientific methods and methods (Hewson, 1992, P1-18).

He also confirmed many recent studies in the field of learning science, such as the study (Trumper & Gorsky 1993) and a study by (Buck walter 1993) and a study (Thijs & Berg. 1995) the need to discover such alternative concepts among students and work on modifying and correcting them by following new approaches, models, and learning and teaching strategies. Allow them to build the right concepts themselves, based on the discovery of their alternative concepts.

The constructivist approach is concerned with the conceptual schemes that the students have and is concerned with their active and effective application in new situations, meaning that it is concerned with what they have learned, and the transfer of knowledge. And the experience to benefit from it in building experiences related to new situations. (Trumper, 1990, p. 710).

And (Zaytoun, 1994) points out that the fulcrum in the theory Constructivism is the use of ideas that capture the core of the learner to form new experiences, and learning occurs when modifying the ideas that the learner possesses, or adding new information to his knowledge structure , or by reorganizing the existing ideas in that structure, and this means that constructivism focuses on the knowledge structure of the individual and what operations occur in it. (Zeitoun, 1994: 84).

Based on the foregoing, the current research comes to be an addition to what was stated in the research and studies that dealt with the subject of misconception the concepts of cloning and photosynthesis in vegetable plants and is the first of its kind in the country.

Research objective

Identifying the level of misconception among the students of the biology branch/ department of science, faculty of basic education, regarding the concepts of nutrition and respiration in green plants.

Limitations of the Research: the Current Research is Limited to:

- 1- Students of the faculty of basic education, department of science / branch of biology third grade.
- 2- The concepts of nutrition and respiration in green plants.
- 3- The academic year 2022-2023.

Definitions of Key Terms

Misconception

(Al - Ayasrah, 1992) defined it as “every understanding

that is not consistent with what knowledge has reached.” Scientific It may be incomplete and does not amount to a proper scientific understanding of the scientific concept” (Al-Ayasrah, 1992: 11).

(Al-Khalili, 1995) defined it as “the understanding that does not agree with what the scholars agreed upon.” (Al-Khalili, 1995: 109).

(Zeitoun, 1998) defined it as “the student’s inability to give a sound scientific definition of concepts, which is represented in the deficiency, definition, confusion between related terms, confusion between opposite concepts, and haste in generalization” (Zeitoun, 1998: 80-81).

The procedural definition of misconception: Ideas and mental systems that are in the possession of students of the biology branch, department of science, faculty of education about the most important biological concepts of respiration and photosynthesis, and contradict their correct scientific interpretation recognized scientifically.

Concept: (Zakaria and Hanash, 2008) as "groups of things that have common names". (Zakaria and Hanash, 2008:61).

(Al-Luwehiqi, 2010) is “an idea that pertains to a specific phenomenon, relationship, or mental conclusion that is expressed by means of a specific word or term.” (Al-Luwehiqi, 2010: 4).

Respiration: is the process by which energy is released into cells in the presence of oxygen.

Photosynthesis: Photosynthesis is defined as the process carried out by plants and some living organisms through the use of sunlight to produce nutrients from carbon dioxide and water, and this process includes the green pigment chlorophyll and the process of producing oxygen.

Chapter 2

Previous Studies

The Study of Al- (Bayati, 1988)

This study aimed to identify the common life concepts and errors contained in the book of Biology among the students of the fifth scientific grade from the secondary stages, and then to reveal the reasons behind the prevalence of these errors from the point of view of teachers and subject teachers. In which the number was (83) understood, and the research tool was an objective test of the type of multiple test that contained (83) test items. The test was applied to a sample, and it was (500) students. Fifth scientific and in biology (Al-Bayati, 1988: a-b).

The study of (Kilani, 1994)

The study aimed to identify the concepts available about the material that makes up living organisms among the class teachers who are working to complete their qualification at the bachelor's degree. The study has an understanding that bears something of the scientific meaning, and 94% of the study sample do not have the scientific meaning, but rather they have a concept different from it. (Mawla, 17:2000).

The study of (Sabarini and Al-Khatib, 1994)

An experimental study aimed at investigating the effectiveness of conceptual change strategies. The classroom aims at correcting the misconception and providing the students of the first year of secondary school with sound scientific understanding of motion concepts in the field of gravity. The study found the superiority of the group that used the method in gaining the correct scientific understanding of the concepts of motion in the field of gravity. (Mawla, 2000:18).

The Study of (Al-Rubaie, 1995)

life concepts common Mistakes among the third intermediate grade students. This study aimed to identify the common concepts of error among the third intermediate grade students in the city of Baghdad and to identify the significant differences. Statistics in life concepts common Error if found between boys and girls.

The researcher limited the concepts that were analyzed, as they numbered (95) concepts, and 95 test items were built from the type of multiple choice. The test was applied to a survey sample (100) students, and 5 items were excluded. The test was applied in its final form to (1050) male and female students who used the ratio Percentage in defining common concepts. Errors that numbered (38) concept. (Al-Rubaie, 1995: A-B).

The Study of (Al-Shahrani, 1996)

The study aimed to identify the misconception of some concepts of nutrition and respiration in green plants among students in the secondary and university levels in Asir region. The study sample consisted of 192 students, of whom 109 were students in the secondary stage (the third year of secondary school - natural sciences) from secondary schools, and 83 students in the seventh level in the faculty of Education in Abha. To achieve the objectives of this study, one tool was used (the achievement test of 25 questions). By feeding and breathing in green plants, and after conducting honesty and consistency, the experiment was applied, and the researcher concluded through the used statistics that there are patterns of misconception among secondary and university students with regard to related concepts.

By feeding and respiration in plants (Al-Shahrani, 1996, 8-36).

Foreign Studies**The study of (Trivet and Heslam, 1986)**

Trivet and Heslam in their study developed a tool for A tool for assessing misconceptions among middle and high school students in Australia regarding photosynthesis and respiration in plants., and the researchers concluded that the majority of students (study sample) do not understand the nature and function of photosynthesis and do not realize that respiration in plants is a process of changing energy, and they consider that photosynthesis and everything is a source of energy. (Al-Shahrai , 1996: 17).

The Study of (Wandersee, 1986)

The study aimed to identify the effectiveness of teaching the history of science on predicting concepts. The wrong scientific concept among students, and he focused in his study on the concept of photosynthesis, and the results of the study were based on the fact that the concept of photosynthesis among elementary and middle school students is similar to the concept that scientists had previously realized in photosynthesis, but it was developed or was eliminated and canceled. (Al-Shahrani, 1996, p. 17).

Chapter 3**Research Procedures****First: Research community and its sample**

The current research community is represented by all students of the third grade/ department of science (branch of biology) of the faculty of basic education in Iraq, and the students of the third grade/ department of science (branch of biology) of the faculty of basic education, Al-Mustansiriya University were intentionally chosen as a sample for research and reached (78) students, with a rate of (27) Male and (51) female students.

Second: Research tool

To achieve the aim of the study, the researcher used a test (multiple choice) as a research tool, as this type of test measures the level of knowledge of students and the extent of their ability and understanding of some concepts. By feeding and breathing in green plants, this type of test is required as promised in its paragraphs, so that each question has four alternatives, one of which

represents a correct answer (scientifically sound understanding), and the student must identify it from among the wrong alternatives. The preparation of the test has gone through the following steps:

- 1- Reviewing the literature related to this field and benefiting from it in building test vocabulary.
- 2- After reviewing the biology books prescribed for the third grade and the first and second stages of the curriculum of the faculties of basic education (biology branch), the extent to which the book included the two concepts of nutrition and respiration in green plants was identified. A test of (50) items of multiple-choice type was prepared.

The validity of the tool

The validity of the test is one of the basic conditions that must be available in the research tool, and in order for the test prepared by the researcher to be valid, its paragraphs were presented to a group of arbitrators with experience in the field of teaching methods and life sciences. to present their proposals and opinions about it, and they made a number of observations and proposals regarding its suitability for the purpose for which it was prepared and in terms of Scientific, with an agreement rate of (80%). All the suggestions, amendments, additions, reformulations or deletions made by the arbitrators have been implemented, and it has become in its final form containing (50) paragraphs and ready to be applied to the survey sample.

The Survey Sample.

The purpose of applying the test to the sample survey is to know the level of difficulty or ease of each paragraph, the strength of its distinction, the effectiveness of alternatives, stability, and an estimate of the time required to answer the test. The test was applied to a sample representing (50) male and female students in the science department of the third grade of the faculty of basic education, Diyala University. It was found that all of its paragraphs are clear, and it was found that the average response time ranged between (55-75) minutes. The answers were corrected and arranged in descending order, and the highest category (30%) was chosen.) and the lower category (30%), as the number of each of them reached (17) individuals, and the degrees of the upper group ranged between (0-50) degrees.

Ease coefficient

The ease coefficient is defined as the percentage of respondents who answered the question with a correct answer on the number of respondents or the number of those who tried to answer. (Rosan, 1992: 92) The ease coefficient was calculated for the paragraphs, whose value ranged between (30%-70%). Thus, the test items

are considered good, as the paragraph is considered suitable if its ease coefficient ranges between (20%-80%). (Rousan, 1992: 84).

The effectiveness of the alternatives

The alternatives in objective tests of the type of multiplex test are basic in distracting the attention of students who do not know the correct answer and not allowing them to reach the correct answer by chance. (Al-Tayeb et al., 2005: 104). The wrong alternative is effective when it attracts more students in the lower group than the students in the upper group towards that alternative (Al-Baghdadi, 1980: 229).

Based on the above, the effectiveness of the wrong alternatives for the test items was verified the number of which is (50) paragraphs, meaning that the number of those who were attracted from the lower category is greater than the number of those who were attracted from the upper category, which confirms the effectiveness of the alternatives to the paragraphs.

Constancy: The stability of the test was calculated using the Cord Richardson-20 equation, as this equation measures the coefficient of internal consistency of the test items and is suitable for achievement tests in which the degree is (1) and (0) (Melhem, 2000: 265). After applying the equation, it was found that the stability coefficient is (77). %) Cronlund indicates that the tests whose stability ranges between (60-80 % (1976, p125 Cronlund) is considered to be of suitable stability. With these procedures, the test has become ready for application, and the test conditions are met in terms of

The Application of the Experiment

The test was applied to students of the third grade, department of Science/ branch of biology, on 10/20/2022.

Statistical Means

1- Ease coefficient = $\frac{\text{the number of those who answered the question correctly}}{\text{the number of those who tried to answer it}} * 100\%$

The number of respondents who tried to answer it (Rousan, 1992: 83)

2- Discrimination power = $\frac{\text{the number of students whose answers are correct in the upper group} * \text{the number of students whose answers are correct in the lower group}}{\text{the number of students in one of the two groups}}$

(Al-Zahir, 1999: 125-130)

3- Coder-Richardson equation -20 $R = \frac{\sum (X_i - \bar{X})^2}{N - 1 S_X^2}$ [1-Ep9]

(Melhem, 2000: 265)

Chapter Four

The Presentation and Interpretation of the Results

This study aims to identify the level of misconception

among the students of the biology branch/ department of science, faculty of basic education regarding nutrition and respiration in green plants. This is done by processing the data obtained from the test results by extracting the frequencies of the ratios.

Table (1): Frequency and percentages of correct and incorrect answers to the test items for the concepts of nutrition and respiration in green plants (ratio = 78)

question no	correct answers	percentage	wrong answers	percentage
1	47	60,25	31	39,74
2	43	55,12	35	44,87
3	51	65,38	27	34,61
4	7	8,97	71	91,02
5	33	42,30	45	57,69
6	15	19,23	63	80,76
7	43	55,12	35	44,87
8	31	39,74	47	60,25
9	22	28,20	56	71,79
10	33	42,30	45	57,69
11	27	34,61	51	65,38
12	20	25,64	58	74,58
13	18	23,07	60	76,92
14	29	37,17	49	62,82
15	21	27,17	57	73,07
16	35	44,78	43	55,12
17	47	60,25	31	39,74
18	21	26,92	57	73,07
19	33	42,23	45	57,69
20	23	29,48	55	70,51
21	22	28,20	56	71,79
22	15	19,23	63	80,76
23	19	24,35	59	75,64
24	11	14,10	67	85,89
25	21	26,92	57	73,07
26	24	30,76	54	69,23
27	27	34,61	51	65,38
28	17	21,79	61	78,20
29	25	32,05	53	67,94
30	27	34,61	51	65,35
31	12	15,38	66	84,61
32	16	20,51	62	79,48
33	24	30,76	54	69,23
34	26	33,33	52	66,66
35	27	34,61	51	65,38
36	27	34,61	51	65,38
37	23	29,48	55	70,51
38	21	26,92	57	73,07
39	21	26,92	57	73,07
40	20	25,64	58	74,35
41	17	21,79	61	78,20
42	16	20,51	62	79,48
43	33	42,30	45	57,69
44	25	32,05	53	67,94
45	12	15,38	66	84,61
46	23	29,48	55	70,51
47	27	34,61	51	65,38
48	30	39,74	47	60,25
49	35	44,78	43	55,12
50	8	10,25	70	89,74

It is clear from the table that the students of the third grade in the faculty of basic education have conceptual errors with regard to the concepts of photosynthesis and

respiration in plants, in relation to the wrong answers of the study sample, which is (73.4), with regard to the definition of nutrition of which 23%, and the highest percentage of error in the questions related to food elements was about (48.6%)

and the lowest percentage was about (22.9%).

As for the importance of photosynthesis, the errors in the students' answers ranged between (15.7-66.83%). As for the concept of respiration, the percentage of erroneous ones ranged between (31.2-83.5), It is considered a high percentage, and this indicates nothing but the prevalence of misconception among third-grade students of the department of science in the faculty of basic education with regard to biological concepts, especially the concepts of respiration and photosynthesis, as these concepts are the basic girls on which broader and more comprehensive ideas, principles and generalizations are built in this field.

Discussions of the Results

The results of this study showed that there are patterns of misconception among In undergraduate students with regard to related concepts feeding and respiration in plants. The adoption of these alternative or wrong ideas by these students may be due to many reasons, the most important of which is that they do not study the subjects of nutrition, photosynthesis and respiration except a very small amount, and superficially in the stages of their education before university, which makes them lose the most important ideas and principles. This is in addition to the fact that these students apply the memorization method in their study of biology topics without their interest in deep understanding of these topics because of the usual methods and methods used in practical lessons and the lack of laboratories, equipment and tools used during the lecture, which forces the teacher to give most of the concepts theoretically. And then, over time, only some distorted information remains in their minds that do not benefit him, so we lack teaching methods that focus on training the student to build his ideas, develop him, and correct his conceptual error.

Recommendations

A- Assigning a number of experts in developing curricula to diagnose patterns of misconception among students of different stages of education in scientific subjects and other subjects, to benefit from this during the development or planning of curricula in these stages.

B- Developing appropriate methods and teaching methods that work to effectively correct the misconception of students, because wrong scientific concepts resistance to modification and change by traditional teaching methods.

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