

Effective reading skills and its relationship to a deep understanding of chemistry among middle school students in Iraq

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Abstract: The goal of the research is to identify effective reading skills and deep understanding in chemistry among middle school students in Iraq, the aim of the research is to identify the correlational relationship between effective reading skills and deep understanding, the relational descriptive research approach was adopted, and the research sample consisted of (250) students from the first intermediate grade, that is, 32% of the research community from the academic year 2020/2021 AD was chosen from the Baghdad Governorate Center from the Al-Karkh Education Directorates (first, second and third), the research tools were represented by the numbers of the effective reading skills scale consisting of (40) items and the numbers of the deep understanding test of (35) a paragraph , The Statistical Package for Social Sciences (SPSS + 22) was adopted to treat the research results, and the results of the research showed that middle school students have weakness in effective reading skills and deep understanding, and that there is a statistically significant positive correlation between effective reading and deep understanding, the researchers recommended the need for chemistry teachers to focus on deep understanding and its skills when Teaching chemistry content for the first intermediate grade as well as effective reading skills.

Key words: active reading, deep understanding, chemistry.

Research problem: One of the recent trends that the educational and learning process emphasizes and which is in line with the data of modern knowledge is the process of arranging the student's environment in a way that contributes to encouraging the practice of thinking skills, starting with simple mental processes, and ending with the mental processes that lead to the production of ideas and solving problems, and from the researcher's humble experience in teaching chemistry as well as polling the opinions of a sample of chemistry teachers and supervisors in secondary schools touch that the educational reality in teaching chemistry to intermediate first-grade students is concerned with how to reproduce chemical knowledge and have the right amount of information and answers only and does not stress the production of chemical knowledge , This generates deficiencies in the skills, processes and strategies used by first-grade intermediate students before, during and after reading chemical texts, which in turn may affect the development of deepening their knowledge and their ability to present various interpretations of the chemical problem and find solutions to it or make comparisons, classifications, summaries, decision-making and others, most chemistry students in the first intermediate grade do not precisely analyze what they have learned through the thinking process that helps them clarify and refine chemical information, or critically examine new ideas and facts, or link chemical information with real life so that they go beyond the superficial knowledge of learning to thinking in a multi-dimensional way or deep, so the research problem crystallized by answering the following question: "What is the relationship of effective reading skills to a deep understanding of chemistry among middle school students in Iraq?"

Research importance: Effective reading is one of the means of success in life, as it is the most used method for interacting with others, conveying ideas and expressing them, and in understanding the past, present and future, and that a lot of educational research has confirmed that no student can to show his distinction in any subject unless he possesses effective reading skills, (Barakat, 2019: 82) that depend on the speed of its performance, understanding and comprehension resulting from it and its connection with educational goals. (Mahdi, 2019: 72), when the reader begins to read, the process of receiving information and the meaning of it begins, and here an interaction takes place between the reader and the reading text, interspersed with processes of interpretation, Explanation, conclusion, awareness of meanings, and ideas contained in the material and linking this information with information and previous experience of the student and judging and benefiting from it (Zayer and Ehwud, 2015: 75). Despite the

multiplicity of cultural means in the modern era, such as theater, cinema, and the two audiovisual radio stations, effective reading exceeds these means are important because of their ease, speed and non-compliance with a specific time or place, and they provide students with information that helps them develop their own tendencies, raise their level of understanding of social issues, stimulate critical thinking in them and provide opportunities for enjoyment and entertainment, as well as developing the ability to imagine and creative thinking. (Lafey, 2000: 12), and on the other hand (Dunk, 2012) believes that "students should form positive attitudes about learning when they develop their effective reading, in order for them to develop a deep understanding." (Dunkl, 2012: 67), In addition, studies have shown that deep understanding does not happen automatically, but needs to form mental processes for the student to develop his abilities to interpret, meditate, and create deep treatments represented in the processes of understanding meanings, identifying principles and ideas, employing evidence and proofs, and integrating new knowledge with previous knowledge and critical evaluation as a study (al-Jhoori, 2012:51) study (Al-Otaibi, 2016: 18) study (Talaba, 2009: 171), that the learning objectives are currently focused on the student developing a deep understanding of the main concepts in the fields of learning (Cartier et al., 2001: 232) and the understanding has become This is the deepest part of one of the most important learning outcomes stipulated within the global standards for education. (Russell, 2002: 122), deep understanding skills are one of the thinking skills that represent a group of interrelated abilities that develop and deepen through questions and investigation arising from meditation, discussion and use of ideas. (Jaber, 2003: 287), so educators in the field of science education raised the slogan of teaching in order to understand that deep understanding represents one of the goals of science education that should be achieved by all students, and understanding is an advanced level of deep knowledge after the student acquires a set of knowledge and skills after He formulates it in his mind in a meaningful way, here lies the importance of deep understanding in the student's ability to transfer the knowledge he acquired in the classroom to life situations in his community. (Muammar, 2019: 2) Recent trends in teaching emphasize an emphasis on depth instead of expansion, modern global projects have agreed with the idea of deepening understanding and knowledge, the Understanding Project Understanding Scientific project, which developed a theory of scientific understanding that clarifies the foundations for what is "scientific understanding," recommended. "and how to achieve it and pay attention to many thinking skills, which will make it easier for the student to teach in depth and efficiency, among these trends are (TIMSS 2008, the International Study of Mathematics and Science) and (NRC 2012) is one of the quality procedures used in building projects and production halls) and (AAAS 2012) American Association for the Advancement of Science And NGSS 2013 Next Generation Standards for Science Learning (Ford, 2015: 143), (Hani and Al-Damrash, 2015) identified the features of a deep understanding in the student's insistence on understanding the content of the material, the critical interaction with others regarding the content, the connection between new ideas and knowledge and previous experiences, examining the logical discussions, and what follows the imposition of assumptions, prediction, and decision-making, And the use of questions during discussion and learning. " (Hani and Al-Damrash, 2015: 90), and by examining the educational literature, it was found that there is a dearth of local and Arab descriptive studies that dealt with deep understanding, it was also found that the interest of previous studies dealt with the variable of deep understanding on the intermediate stages, such as the study (Abdul Hassan, 2016) and the study (Abu Kamil, 2020), and the study (Chin & Brown 2000: 131), which indicates the importance of paying attention to a deep understanding of middle school students.

The research acquires theoretical and scientific importance as:

- 1- It is considered the first attempt at a descriptive study in the Republic of Iraq (within the limits of our knowledge) concerned with the identification of effective reading or deep understanding of students in the subject of chemistry, as well as that no Arab or foreign study related to the research variables was found together.
- 2- It sheds light on effective reading skills, which is one of the main elements in the ability to comprehend the read deeply.
- 3- Provides a visualization of deep understanding skills, which is one of the thinking skills that is represented in the student's ability to transfer the knowledge acquired within the classroom to life situations in his community.
- 4- It shows the role of the advanced level of understanding and deep knowledge in the decision-making process, problem-solving, research, investigation and evaluation, as well as focusing on meaningful cognitive patterns.

In practical terms, the research gains importance as:

- 1- Chemistry teachers are known for how to get out of the routine pattern in learning chemistry experiences, to delve into the student's depth of content explanations, examine logical discussions, ask questions, link causes and outcomes, build ideas, and summon previous knowledge to reach appropriate decisions.
- 2- The developers of chemistry curricula benefit from the focus of deep understanding and the incorporation of his skills into the content of chemistry textbooks.
- 3- It is of practical use for middle school students to get acquainted with the requirements of effective reading, starting from the process of receiving chemical information to judging and benefiting from it.

4- The research is in line with the recommendations of the Iraqi Ministry of Education to continue diagnosing the weaknesses of students to develop and update teaching methods.

5- Contributes to the numbers of the effective reading skills scale, which is useful for detection by middle school students.

6- Contributes to the preparation of a test of deep understanding skills in chemistry that is useful for detection by middle school students.

Research aims: The research aims to identify:

- Effective reading skills in chemistry for middle school students
- Understanding skills in deep chemistry for middle school students
- The correlation between effective reading skills and deep understanding among middle school students.

Search limits: Search is limited by:

1. Chemistry students in the first intermediate grade in the General Directorates of Education Al-Karkh / (first, second and third), in the district center of Baghdad / Iraq.

2. Academic year 2020-2021.

Defining terms

The effective reading: Define it (Mahdi, 2019): "The extent of understanding and comprehension obtained in relation to the time taken by the student to achieve it, and effectiveness is measured by the extent of learning achieved during a specific unit of time, the greater the result of reading, and the less time and effort, the greater the effectiveness, that is, the more quickly you read and did not understand what you read, because your reading was not effective and your effort and time were wasted. " (Mahdi, 2019: 72)

Procedural definition of effective reading skills: Effective methods and methods that are easy and accurate and used by students of the first intermediate grade before, during and after reading chemical texts and measured by the degree obtained by the student in the scale prepared for this purpose.

Deep understanding defined it (Dahlan, 2017): "The student's ability to meditate and relate between previous and subsequent information in a logical framework in the subject, depending on multiple skills such as interpretation, prediction, questioning, intellectual fluency, decision-making and other skills." (Dahlan, 2017: 8)

Procedural definition of deep understanding: a mental process that first-grade intermediate students perform when reading chemical texts and includes generative thinking skills and consists of (fluency, flexibility and prediction in light of data and hypothesis), the nature of interpretations, questioning, and decision-making, measured by the degree that the student gets in the test prepared for this purpose.

Theoretical background:

Effective reading skills: Effective reading is represented by three skills as follows:

First: Skills before reading: These are all the skills, processes and strategies that the student uses before reading texts, such as determining the purpose of reading the text, reviewing the read text, activating previous knowledge, and making predictions. (Abdullah, 2014: 106), and the psychological and mental preparation for reading, including external and internal preparation and browsing, (Hilal, 2005: 42),

Second: Skills during Reading: These are all the skills, processes and strategies that the student uses while reading the text, such as paying attention to the quality of the text, exciting discussions and linking previous knowledge. (Abdullah, 2014: 107), and mental and visual skills, including surveying, which means that the student uses his eyesight in the effective look at the page, starting from the headline to sub-headings, illustrations, graphs and tables, and questions, and it means that the student directs himself many questions and tries to answer them and the height and decline of the reading speed means that the student can link the speed Reading with the extent and importance of the information that he reads, reading out loud and then evaluating (Hilal, 2005: 69) and reaching understanding (Abdullah, 2014: 107), and vital reading, which means that the student recognizes the text read from the title and retrieves his previous knowledge of the readable text, records the most important main points, and defines the information he wants to obtain from the read text (Hilal, 2005: 57), as for reading according to meaning, it means searching for the literal meaning of words, concluding, anticipating and searching for evaluative meaning (Hilal, 2005: 62)

Third: Post-reading skills: These are all the skills, processes, and strategies that the student uses after reading, including meditation, and from contemplative thinking skills, reaching conclusions and giving explanations. (Abdullah, 2014: 108) And linking to higher levels of thinking: including the skills of analysis, synthesis and evaluation, which are essential skills in critical and creative thinking that the student shows in problem-solving situations and deduction or logical reasoning (Hillis, 2011: 231) and summarizing: it means the students' extracting important and basic information in a brief and succinct manner and reformulating it with his words and expressions (Hilal, 2005: 72) and then arriving at the main idea that expresses in focus and conciseness what he wants the text to

say (Hilal, 2005: 67). In this research, the three areas of skills before reading, during reading, and after reading are adopted and their indicators for the numbers and paragraphs of the effective reading skills scale.

Deep comprehension skills and its classifications: After reviewing the educational literature, it became evident that there is a difference in the educators' views regarding the release of the characteristic of deep understanding from being (skills, dimensions, appearances, or features), and since deep understanding is more than just possessing knowledge but rather includes dimensions A mindset that includes the abilities of meditation, discussion, and the use of ideas and insights. Therefore, in this research, the term deep understanding skills is used to express it. The skills of deep understanding varied and varied. (Chin & David 2000) identified aspects of deep understanding in (generative thinking, the nature of interpretations, asking questions, metacognition activities, approaches to completing the task) in (Dahlan, 2017: 29), as for (Broich 2001) define the features of deep understanding in (insistence on understanding the material, and critical interaction with others regarding the content of the material, the link between new ideas and knowledge and previous experiences, examines the logical discussions and the subsequent assumption of assumptions, prediction, decision-making, the use of deep questions during learning and the use of organizational methods to integrate ideas) in (Khalil, 2008: 79). (Jaber, 2003) listed the manifestations of deep understanding in six aspects, namely (explanation, interpretation, application, perspective, empathy, and self-knowledge) (Jaber, 2003: 226). In the same context, the Institute for Training and Education Development (Tedl, 2003) defined the educational dimensions For deep understanding represented in the growth and development of responses related to tasks, the survival of the learning effect for a long time, the ability to apply the responses in new situations, the generation of new meanings and models, the enhancement of independence in learning, and finally the orientation towards self-learning. In (Dahlan, 2017: 29), and (Davis, 2009) pointed out that the aspects of deep understanding are represented in (basic knowledge, application, integration, human dimension, care, learning to learn). (Davis, 2009: 6), while the study (Lotfollah 2006: 610), the study (Hussein, 2008: 36), the study (Ahmed, 2012: 176) and the study (Hani Waldemerdash, 2015: 116) chose the skills of deep understanding represented Generative thinking skills that consist of (fluency, flexibility and prediction in light of data and imposing hypotheses), the skill of the nature of interpretations, and the skill of asking questions and making decisions. From what has been presented it appears that there is agreement between educators and some previous studies on the classifications of deep understanding skills represented by generative thinking skills, which consist of (fluency, flexibility and prediction in the light of data and imposing assumptions), The nature of the interpretations, the asking of questions, and the decision-making. The classifications contained in the educational literature are taken into account, taking into account the classifications adopted by previous studies, as it was found that most of these studies conducted in the field of science teaching methods adopted these skills and in light of this they will be adopted in this research when preparing a deep understanding test for middle school students because It achieves the goal of the test represented by measuring the cognitive and mental dimensions of students, such as providing different interpretations of a specific topic in chemistry, linking new ideas, knowledge and previous experiences, imposing hypotheses, predicting, making decisions, and asking deep questions during learning, as well as its relevance to the level of students and the nature of chemistry for the first intermediate grade.

Research Methodology: It adopt (the relational descriptive approach) in identifying effective reading skills and their relationship to deep understanding in chemistry among intermediate school students.

Research community: The research community is determined by all students in the first intermediate grade in intermediate and secondary day schools affiliated to the General Directorates of Education in Baghdad Al-Karkh Governorate / (first, second and third) in Iraq, for the academic year (2020-2021) and their number (78607) male And female student.

Research sample: The research sample: The sample was chosen (by a simple random method), it amounted to (250) students from the Baghdad Education Directorate Al-Karkh (first, second and third), with a percentage of (32%) from the research community.

Research tools:

First: Effective Reading Skills Scale: The Effective Reading Scale was prepared as follows:

A- Determining the objective of the scale: The goal of the scale is to measure effective methods and methods that are easy and accurate and used by students of the first intermediate grade before, during and after reading chemical texts.

B- Preparing the effective reading skills scale and its instructions: The scale consisted in its initial form of (40) paragraphs, distributed into (3) skills, namely (skills before reading) from (7) paragraphs, and (skills during reading) from (22) paragraphs. And (skills after reading) from (11) paragraphs, so that students answer these paragraphs according to the five-alternative Likert scale, which are (very much, much, somewhat, little, very little), and the degree to this ranges the scale is between (5) degrees in case of answering (too many), and one degree in case of

answering (very few), and thus the largest score for the scale becomes (200), and the lowest score for the scale is (40) with a hypothetical average of the scale (120) degrees. Instructions for answering the scale are formulated.

C- The validity of the scale of effective reading skills: the paragraphs of the scale were presented to a group of referees in the field of teaching methods and psychology, and they were asked to express an opinion on the validity of the scale paragraphs and its alternatives, and after analyzing the comments of the referees by adopting the Chi-square, a statistical method, it was found that The value of the chi-square calculated for all paragraphs ranged between (9,8-20), which is greater than the tabular value of (3.84) at the level of significance (0.05) with a degree of freedom (1).

Exploratory application of the Effective Reading Skills Scale: The purpose of this procedure is to verify the clarity of the instructions and paragraphs for students, and to determine the time required to respond and the average time to answer the test was (30) minutes.

The psychometric characteristics of the scale's paragraphs: - The scale was applied to a statistical analysis sample consisting of (200) male and female students, randomly selected from the first intermediate grade of Baghdad education directorates, Al-Karkh third. All of them were greater than the tabular T value (1,960) and the degree of freedom (106). As for the validity of the construct, it was verified by extracting (the relationship of each paragraph's score to the total score of the scale) (and the correlation coefficient of the total degree of skill with the total score of the scale) and (the relationship of the score of the paragraph with the field the relationship of the field score with other areas of the effective reading skills scale (the internal correlation matrix) has been verified by using the Pearson correlation coefficient between the scores of each field with the other areas of the scale, By applying the Pearson correlation coefficient, all the values of the correlation coefficients were statistically significant when compared to the tabular value (0,139) and the degree of freedom (198) and the level of significance (0,05), and this means that all areas are homogeneous with each other in measuring effective reading skills. Two methods were adopted for its calculation, one of which was by the Cronbach-Alpha method, and the stability value of the scale in this method was (0.79) and the other was by the test-retest method, by adopting the correlation coefficient between the two halves by the method (Pearson), its value was (0,83), which is a good stability and is acceptable in the correlational descriptive studies, and (Odeh, 1999) states that the scale is fixed if the stability value is equal to (0.70) in (Al-Nouri, 2014: 60), thus, the effective reading skills measure has become in its final form consisting of (40) items, consisting of three skills, namely (skill before reading) and consisting of 7 items, and (skill during reading) consists of 22 items, and (skill after reading) consists of 11 items, and the total score of the scale is at its upper limit (200) degrees, and its minimum is (40) degrees and with a hypothetical average of (120) degrees, so the scale is ready. To apply to the research sample.

Second: The deep understanding test: The deep understanding test was prepared according to the following steps:

A- Determining the purpose of the deep comprehension test: The aim of the test is to measure the mental processes that the first intermediate grade students perform when reading chemical texts.

B- Determining the skills of deep understanding: After reviewing the literature, research and previous studies that dealt with deep understanding, the skills of deep understanding were identified with generative thinking skills and consist of (fluency, flexibility and prediction in the light of data and imposing assumptions), the nature of interpretations, questioning, and decision-making.

C - Preparing the deep understanding test and its instructions: The test consisted in its initial form of (35) items, divided into (7) skills, namely (fluency, flexibility, prediction in light of data, imposing hypotheses, nature of interpretations, asking questions, making decisions) have been verified Whoever endorsed it by submitting it to a group of referees specialized in the field of methods of teaching chemistry and chemistry sciences.

D- The psychometric characteristics of the test items: - The test was applied to a sample of statistical analysis that consisted of (200) male and female students randomly selected from the first intermediate grade students, the difficulty factor for the objective questions was extracted and found to range between (0.53 - 0.29) and the essay (0.66 - 0.44), and (Odeh, 2002) in (Nima, 2014: 63) states that the paragraph whose difficulty factor is between (0,20 - 0.80) is considered a paragraph with an acceptable difficulty factor, while the coefficient of discrimination is paragraphs Test for a deep understanding of the objective paragraphs, the distinction of which ranged between (0,92 - 0,48), As for the article, its distinction ranged between (0.59 - 0.33), and the effectiveness of each wrong alternative for each test paragraph was calculated by using the efficiency of alternatives equation, and it was found that all the wrong alternatives were negative, that is, they are camouflaged to attract weak students. The veracity of the structure was verified by extracting (the relationship of the score of the paragraph to the total score of the deep comprehension test, and the relationship of the score of the paragraph to the skill to which it belongs, and the internal correlations between skill scores and the total score for the deep understanding test). All its values are statistically significant when compared to the tabular value of the correlation coefficient (0,139) at the level of significance (0.05) and the degree of freedom (198), as for the stability of the test, it was calculated by the method of

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internal consistency (Alpha - Cronbach) and the reliability of the test as a whole was (0,80). Thus, the deep understanding test in chemistry for the first intermediate grade in its final form consisted of (35) items, and the total score of the test was at its upper limit (95) degrees, with a minimum (0) degree and a hypothetical average of (47.5) degrees, so the scale is ready for application to the basic research sample.

Display search results: Display research results

The first objective: To identify the degree of effective reading skills in chemistry among middle school students. After calculating the grades obtained by the students on the scale of effective reading skills, the T-test was approved for one sample, Table (1)

Table (1) T-test results for one sample of the scores of the Effective Reading Skills Scale

variable	Number	The arithmetic mean	standard deviation	The hypothetical mean	T-value		Indication level	Indication of the difference
					Calculated	Calculated		
Effective reading skills	250	150,876	28,203	120	17,310	1,960	0,05	Function

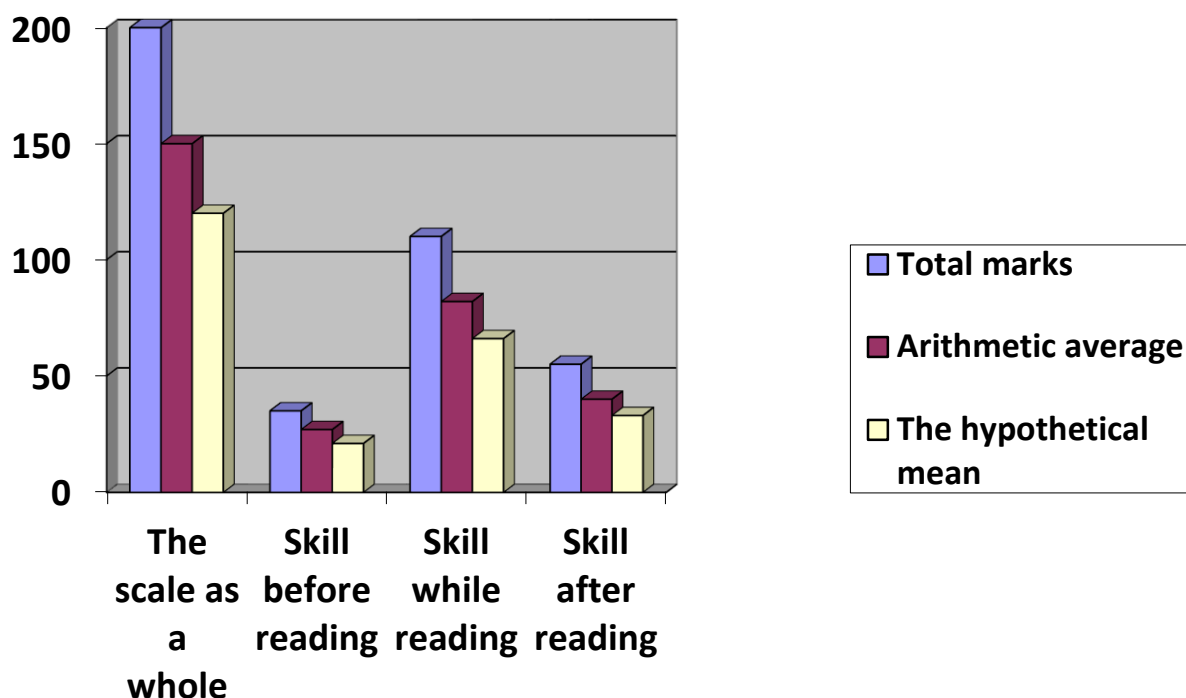
It can be seen from Table (1) that the calculated T value amounted to (17,310), which is greater than the tabular T value (1,960), so it is a statistical function at the level (0.05) and with the degree of freedom (249), when comparing between the arithmetic mean of the students 'scores of (150,876) and a standard deviation (28,203), with the hypothetical average of the scale of (120) degrees, it was found that there is a statistically significant difference between the arithmetic mean of the sample and the hypothetical mean of the scale, that is, middle school students possess effective reading skills to a moderate degree. To find out the significance of each skill of effective reading skills, the basic research sample data were analyzed using the T-test for one sample, Table (2).

Table (2) T-test results for one sample of the Effective Reading Skills Scale

Effective reading skills	Number	The arithmetic mean	standard deviation	The hypothetical mean	T-value		Indication level	Indication of the difference
					Calculated	Calculated		
Before reading	7	27.624	5.673	21	18,461	1,960	0,05	Function
While reading	22	82,626	16,119	66	16,337	1,960	0,05	Function
After reading	11	40,808	9,166	33	13,469	1,960	0,05	Function

It is evident from Table (2) that middle school students possess a skill during reading to a greater degree, and then a skill after reading. As for skill before reading, the weaker field was the arithmetic average of a skill during reading greater than the arithmetic average of a skill after reading and this is greater than the arithmetic average of a skill before reading. Figure 1

Figure (1) the arithmetic average of the scores for the effective reading scale fields among the research sample students compared to the hypothetical mean



The second aim: To identify the degree of deep understanding of chemistry among middle school students. After calculating the grades obtained by the students in the level of deep understanding, the T-test was approved for one sample, Table (3)

Table (3) T-test results for one sample for deep understanding test scores

Variable	Number	The arithmetic mean	standard deviation	The hypothetical mean	T-value		Indication level	Indication of the difference
					Calculated	Calculated		
Deep understanding	250	45,572	7,380	47.5	- 4,130	1,960	0,05	Not a function

It can be seen from Table (3) that the calculated T value amounted to (4,130 -), which is smaller than the tabular T value (1,960), so it is not statistically significant at the level (0.05) and with a degree of freedom (249), and when comparing between the arithmetic mean of the students 'grades of (45,572) and a standard deviation (7,380), with the hypothesis average of the scale of (47.5) degrees, it was found that there is no statistically significant difference between the arithmetic mean of the sample and the hypothetical mean of the test, meaning that intermediate school students have weakness in the skills of deep understanding.

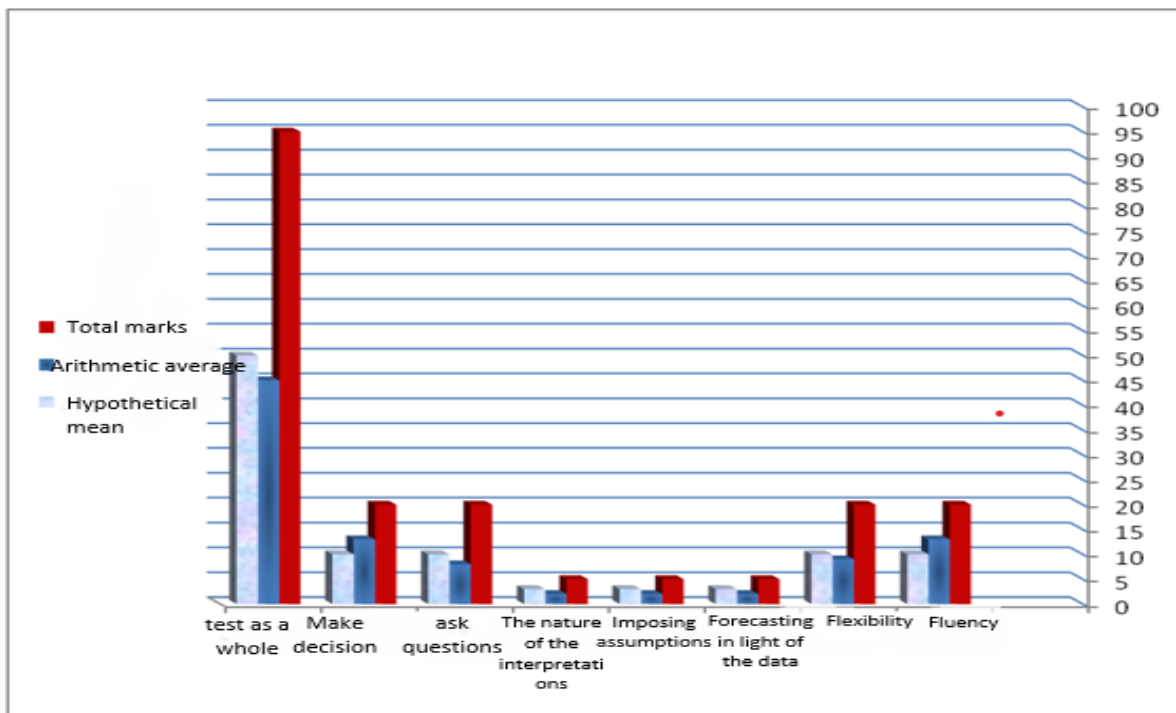
To find out the significance of each skill of the deep understanding skills, the basic research sample data were analyzed using the T-test for one sample, Table (4).

Table (4) T-test results for one sample for deep understanding test skills

Deep understanding skills	Number	The arithmetic mean	standard deviation	The hypothetical mean	T-value		Indication level	Indication of the difference
					Calculated	Calculated		
Fluency	5	13.48	3.7	10	14,868	1.96	0,05	Function

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Flexibility	5	9,132	2,647	10	- 5,185	1.96	0,05	Not a function
Forecasting in light of the data	5	2,536	1.133	2.5	0,502	1.96	0,05	Not a function
Imposing assumptions	5	2,408	1.199	2.5	-1,213	1.96	0,05	Not a function
The nature of the interpretations	5	2,314	1.175	2.5	- 2,484	1.96	0,05	Not a function
ask questions	5	8,404	4.412	10	- 5,719	1.96	0,05	Not a function
Make decision	5	12,524	3,607	10	11,063	1.96	0,05	Function



It is evident from Table (4) that middle school students possess the skill of fluency and decision-making and have weaknesses in each of the skills (flexibility, forecasting in light of data, imposing assumptions, the nature of interpretations, asking questions) Figure (2)

Figure (2) the average score for each skill of the deep understanding test skills for the research sample students compared to the hypothetical average

third aim third: The correlation between effective reading skills and deep understanding in chemistry for middle school students: After calculating the grades obtained by students in the scale of effective reading skills and the deep comprehension test, the Pearson correlation coefficient was adopted, Table (5)

Table (5) values of the correlation coefficient between the correlation between effective reading skills and deep understanding

Variables	Effective reading	Before reading	While reading	After reading	indication
Deep understanding	0.388	0.351	0.385	0.314	Function
Fluency	0.214	0.212	0.211	0.162	Function
Flexibility	0.194	0.157	0.197	0.166	Function
Forecasting in light of the data	0.181	0.205	0.165	0.150	Function
Imposing assumptions	0.253	0.192	0.260	0.216	Function
The nature of the interpretations	0.220	0.148	0.221	0.201	Function
ask questions	0.340	0.303	0.342	0.267	Function
Make decision	0.313	0.314	0.304	0.242	Function

It can be seen from Table (5) that all the values of the correlation coefficients are greater than the tabular value of the correlation coefficient, which is (0,124) at the level of significance (0.05) and with a degree of freedom (249), and this means that the correlational relationship between the two variables (effective reading skills and deep understanding) Statistical significance and it is a positive relationship, that is, the more effective reading skills, the higher the level of deep comprehension skills.

Discuss results:

Discussing the results of the effective reading skills scale: The statistical results indicate that the students of the research sample possess effective reading skills in chemistry on the effective reading scale as a whole. This means that the first intermediate grade students can understand and comprehend what they read and are able to obtain the chemical information that requires the discovery and production of knowledge more those who retrieved them as well as analyzing the readable text, and this was clear on the answer of the research sample to the scale paragraphs related to these skills, and to support this interpretation he emphasized (Barakat, 2019), the process of discovering and producing knowledge more than retrieving it to obtain information is evidence of students 'possession of effective reading skills, and this is what cognitive theory confirms" (Barakat, 2019: 96), (Lafey 2000) pointed out that "students' acquisition of effective reading skills can be predicted by the student's ability to analyze the read text to come up with new ways of seeing and dealing with external situations. "(Lafey, 2000: 96) This can be attributed to the content of the science book (The first part) for the first intermediate grade is not overcrowded with information, which gives greater interest in activating the student's role in obtaining information before, during and after reading and their acquisition of different experiences. (Al-Tatari, 2016: 26), as well as activating the role of chemistry teachers by moving away from transmitting literal information to students. These results are consistent with the results of the study (Barakat, 2019: 94).

Discussing the results of the deep understanding test: The statistical results indicate that the students of the research sample have weakness in the skills of deep understanding of chemistry for the first intermediate grade on the test as a whole. The statistical results also showed that the students of the research sample have weak skills (flexibility, predictability in light of the data, and imposition Assumptions, the nature of the interpretations, and asking questions) As for the skill of fluency and the skill of decision-making, they were achieved, and this can be attributed to the adoption of chemistry teachers in the first intermediate grade one method of teaching that is not in

line with the plurality of the mental structures of students, and the presentation of knowledge as deaf templates with the focus of chemistry teachers on Present abstract concepts without supporting them with tangibles, And the lack of focus on the interconnection between previous and new information, which leads to a lack of occurrence of deep understanding, and emphasized (Abbas, 2015) and (Muammar, 2019) in this regard “Among the obstacles to students’ deep understanding is the lack of enrichment of the learning process with electronic and non-electronic learning resources, the focus on abstracts and the reduction of perceptions, the lack of interest in the logical correlation between previous and new information, haste, lack of deliberation and deep thoughtful thinking in expressing an opinion ”(Abbas, 2015: 50) And (Muammar, 2019: 26)., As well as neglecting to adopt teaching methods and strategies for deep understanding. (Al-Shalhoub, 2019: 146), and the results of this study are consistent with the results of a study (chin & brown, 2000 : 131)

Discussion of the results of the effective reading relationship and deep understanding: The statistical results showed that there is a positive relationship between effective reading skills and deep understanding (That is, the more effective reading skills, the greater the deep understanding), and it can be attributed to the fact that effective reading, as indicated by the educational literature in this field, means Deep reading that is represented by a deep understanding of words and sentences and between the lines and linking new knowledge and ideas with previous experiences, which leads the student to ask himself many questions with placing some signs or signs under important phrases or some margins that contribute to a deep understanding of chemical texts and this is the essence of understanding Deep and pointed (Hilal, 2005: 21) in this regard “One of the foundations on which effective reading is based is deep reading, which is represented by a deep understanding of words and sentences between the lines and the student turns into an active reader when he asks himself many questions (Hilal, 2005: 21). As for (Al-Hasnawi, 2019), he indicated“ that it is a feature of understanding. Deep is the link between new knowledge and ideas with previous experiences ”(Al-Hasnawi, 2019: 41), and this is one of the effective reading skills for a skill before reading (activating previous knowledge).

This result was not compared with the results of previous studies because no previous studies were found (within the limits of the researcher's knowledge) that dealt with the contribution of effective reading skills to deep understanding.

Conclusion: According to the results of the research, it was concluded:

- 1- First-grade intermediate students possess effective reading skills in chemistry with a medium degree.
- 2- The intermediate first grade students possess skills during reading, followed by skills after reading, and then skills before reading.
- 3- Middle school students have a weakness in the skills of deep understanding as a whole in the subject of chemistry.
- 4- The arithmetic mean score for the fluency skill was greater than the arithmetic average for the decision-making skill on the deep comprehension test in the chemistry subject for the first intermediate grade students
- 5- There is a direct relationship between effective reading skills and a deep understanding of chemistry for middle school students.

Recommendations: In light of the study results and conclusions, the following recommendations can be made:

- 1- Directing chemistry teachers to pay attention to effective reading skills for students for their role in achieving a deep understanding of chemistry for the first intermediate grade.
- 2- The need to pay attention to deep understanding and its skills when teaching chemistry content for the first intermediate grade.
- 3- Directing the attention of chemistry teachers to encouraging students to ask questions that will help them in research processes to reach higher levels of understanding and depth.
- 4- Organizing training workshops for chemistry teachers to introduce them to the concept of deep understanding and its skills.
- 5- Inviting chemistry teachers to pay attention to the skills of deep understanding in the subject of chemistry, represented by (flexibility, prediction in light of data, and the imposition of hypotheses, the nature of interpretations, and asking questions).
- 6- Spreading awareness programs in all audiovisual media about the importance of reading in general, and effective reading in particular.
- 7- Draw the attention of educational supervisors, specialists and chemistry teachers to the importance of including classroom practices and monthly and final exams with questions that measure deep understanding
- 8- Making use of the effective reading skills scale as a tool for detection by middle school students.

9- Making use of the deep understanding test in chemistry as a tool for detection by first-grade intermediate students.

The proposals: To complete the research, the following studies are proposed:

- Effective reading skills and a deep understanding of physics or biology for middle school students
- Effective reading skills and a deep understanding of chemistry for high school students, according to the gender variable.

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