An Analysis Of Six Scientific- Grade Book Content According To High Order Thinking Skills

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Abstract:

The current research aims to:

Determine higher-order thinking skills (knowledge organizing, applying, analysis, generating or productivity, incorporation and Integration, Evaluation), which are included in the mathematics textbook for the sixth scientific grade

The researchers used the descriptive-analytical approach to analyze the content of the mathematics book for the sixth scientific grade for the academic year 2020/2021 AD, which is approved for teaching in the schools of the Ministry of Education in Iraq, in order to determine the higher-order thinking skills (knowledge, organizing, applying, analysis, generating or productivity, and Integrating or synthesis, Evaluation)

To achieve the goal of the research, the researchers analyzed the mathematics book for the sixth scientific class according to higher-order thinking skills.

They found the following result: -

- The content of the mathematics curriculum for the sixth grade science for the academic year 2020-2021 AD contains higher-order thinking skills (knowledge, organizing, applying , analysis, generating or productivity, incorporation and Integration, Evaluation) in different percentages

The researchers concluded to a set of conclusions and recommendations and proposals.

Research problem:

Various sciences upon which the paths of daily life and its main requirements are based need thinking and its skills; this is because thinking is the first and optimal starting point for finding solutions to all theoretical and practical problems, concerned people try to use these thinking skills, which can be facilitated and overcome in a way that leads to progress and advancement. (Al-Afwan and Muntaha, 2012:11)

Based on what was mentioned above, the researchers believe that the reality of education in general and mathematics education in particular indicates an urgent need for a study focusing on thinking skills in general, and higher-order thinking skills in particular, to find out the weaknesses that led to a lack of attention to thinking skills , as well as , identify whether the reason lies in the mathematics textbook to be taught by the Ministry of Education, or the defect in the lack of teachers preparation in the required manner, which makes them Creative teachers who can perform teaching which develops thinking and its skills, Or is the system of practice exams , or the distribution of lessons in balance with other subjects leads to the adoption of traditional methods of teaching In order to preserve time and adhere to the plans established to complete the course, This was demonstrated to researchers In light of their experience that

there is a problem with the content of the mathematics book ,Perhaps it is that most of what is in the book requires memorization more than understanding, and analysis, generating or production, which resulted in most students were focusing on rote memorization in order to succeed and obtain the highest grades without concern for understanding the subject and developing any of the thinking skills, Based on the foregoing, the idea of conducting a study aimed at (analysis of the sixth-grade mathematics textbook according to higher-order thinking skills) was developed, according to the foregoing, the research problem emerges in the light of the answer to the following main question:

What is the level of higher-order thinking skills inclusion of (knowledge, organizing, analysis, generating, or productivity, integration or synthesis and evaluation) in the content of the mathematics book that is taught to scientific sixth-grade students for the academic year (2020-2021)?

Which leads to the following question?

What is the level of higher-order thinking skills (knowledge, organizing, analysis, generating, or productivity, integration, incorporation and evaluation) that are included in the content of the mathematics book that is taught to scientific sixth-grade students for the academic year (2020-2021)?

Significance of the research:

The researchers find that the significance of the current research can be summarized in the following points:

1. The importance of mathematics, as it represents an essential part of the human knowledge building and it is an element contributing in establish human civilization, In light of what the athletes presented and are presenting regarding discoveries that precede the time in which they are discovered

2. The importance of higher-order thinking skills, as they are one of the important and effective educational dimensions in achieving the educational goals of the educational process.

3. The importance of students' higher order thinking skills; In light of what it represents in providing students with applied skills in solving complex mathematical problems.

4. The importance of the preparatory stage; It qualifies students and prepares them to enter universities, whose graduates represent future leaders.

Research 'objective:

The current research aims to:

Determine higher-order thinking skills (cognitive, organizing, applying , analysis, generating or productivity, Merge and Integration, Evaluation), which are included in the mathematics textbook for the sixth scientific grade

Research limits: -

- Mathematics book for the sixth scientific grade, which is scheduled to be taught by the Ministry of Education in the academic year 2020-2021.
- Higher thinking skills according to North Carolina classification (knowledge skill, organizing skill, applying skill, analysis skill, generating and production skill, integrating & synthesis skill, evaluating skill).

Definitions of Terms

First, the skill: it was indentified by:

: 1. (Jahweya et al. 2009) as: "The ability to perform any action, however it is complex In a specific field easily, quickly and accurately, with the ability to adapt performance to changing conditions." (Al-Jahweya et al., 2009:75)

2. (Abu Zina 2010): It is one of the human capabilities to do something, and this ability is characterized by speed and proficiency. (Abu Zina, 2010:283)

Theoretical definition: The researchers adopted the definition of (Jahweya et al 2009) as a theoretical definition of their research.

The researchers define the skill operationally as:

The ability of the sixth-grade science student to practice complex mental operations, and his mastery of the steps of solving mathematical problems quickly and with high accuracy

Second: Higher-order thinking skills , it was identified by :

1. Marzano (1988) as: those higher thinking skills that are characterized by certain characteristics, in a way that makes them interconnected between the ability to think creatively and critically, as well as thinking beyond knowledge. (Marzano, 1988)

2. (North Carolina 1994) as: Higher-order thinking skills that provide a modified and structured version of the model of the American Association for supervision and Curriculum Development and Education that was developed by (Marzano and his colleagues Costa and Langreher in 1988) Which gradually consists of (knowledge skill, applying skill, organizing skill, analysis skills, production or generating skills, integrating skills, and evaluating skills). (Razzooqi and Nabil, 2108:74)

Theoretical definition: The researchers adopted Marzano's definition, according to which the North Carolina classification was built, which includes (knowledge, organizing, applying , analysis, generating or productivity, integrating or synthesis , and evaluation).

The two researchers define procedural higher thinking skills as: the ability of sixth-grade students to use a skill (knowledge, organizing, applying, analysis, generating or productivity, integrating or synthesis and evaluation), which represents high-order thinking skills included in the mathematics book for the sixth grade science.

Here, the researchers confirm that they have adopted the North Carolina classification of high order thinking skills

Third: Sixth grade science:

The Ministry of Education (1977) defined it as: the last grade in the scientific branch of the preparatory stage, which consists of the three grades (fourth, fifth and sixth) that prepare students for university studies and future life. (Ministry of Education, 1977: 4)

Research Methodology and Procedures:

The current research methodology includes a presentation of the procedures that adopted by the researchers to achieve the goal of their research in analyzing the mathematics book for the sixth scientific grade according to higher-order thinking skills.

The research methodology consists of:

First: Study Methodology:

In this research, the researchers adopted the descriptive-analytical approach in order to analyze the content of the mathematics book for the sixth scientific grade for the academic year 2020/2021 AD, which is approved for teaching in the schools of the Ministry of Educationin order to identify the higher-order

thinking skills that are included in it (knowledge, organizing, applying, analysis, generating or productivity, integrating or synthesis , and evaluation).

Second: The study sample: The sample of the current study includes a sample of the content of the mathematics curriculum for the sixth scientific grade scheduled for the academic year 2020-2021.

Third: search tools:

To verifying the research questions, the researchers adopted a form for analyzing the content of the mathematics book and high order thinking skills that which it included .

Presentation and interpretation of the study results

The researchers deal with a comprehensive presentation of the results that have been concluded and their interpretation according to the objectives of the research and discussed these results in accordance with the theoretical background data and previous studies, as well as the conclusions and recommendations drawn from the results and the most important proposals proposed by the researchers in the light of this study. The results will be displayed And an explanation for analyzing the content of the sixth-grade science mathematics textbook Determining and explaining the higher-order thinking skills involved.

First: Presenting and interpreting the results of the content analysis:

In order to achieve the goal that states the identification of high order thinking skills (knowledge, organizing, applying , analysis, generating , integrating or synthesis , and evaluation) that are included in the content of the mathematics textbook for sixth scientific grade students,

The content of the book was analyzed based on the list of higher-order thinking skills prepared by the researchers and will be presented in light of these skills as follows:

The results of analyzing the content of the mathematics book in the light of higher-order thinking skills

number	Skill	Frequencies	Percentages	Order
-1	Knowledge	136	0.124	**5**
-2	Organizing	125	0.113	**7**
-3	Applying	191	0.173	**1**
-4	Analyzing	190	0.172	**2**
-5	Generating or producing	167	0.15	**3**
-6	Integrating , synthesis	161	0.145	**4**
-7	Evaluating	134	0.123	**6**
Total of skills		**1104**	**1**	

It is seen from the table above, the following:

The applying skill got the highest percentage of higher-order thinking skills It represents (0.173) , while the skill of analysis ranked second among these skills with a percentage of (0.172), while the generating or productivity skill ranked third with a percentage of (0.15) While the skill of integrating ranked fourth with a

percentage (0.145), The knowledge skill ranked fifth with a percentage of (0.124). While the assessment skill ranked sixth with a percentage of (0.123), organizing skill ranked seventh with a percentage (0.113).

Interpretation of the results:

from the table above shows that ,The applying skill ranked first to represent the first goal on which the content of the mathematics book for the sixth scientific grade is based for the academic year 2020-2021 AD regarding higher-order thinking skills, the percentage of this skill was (0.173),

The researchers believe that the reason for this may be due to the fact that the curriculum 'developer took into account in its construction, providing an explanatory introduction before entering the main topic, as well as explaining the ideas in a detailed manner so that the ambiguity of the learner is removed, and thus the content of the curriculum has taken into account the individual differences between the students, as for what is related to the skill of analysis, it occupied the second place, representing a percentage (0.172) of higher thinking skills, and the researchers think that the reason for this is due to the mathematical structure. Where Mathematical facts and principles are not given directly to the learner, but rather the learner needs time and effort to reach his own analysis , determine the features and components and clarifying the interrelationships between the components through a set of examples and individual cases that are presented to him through the content of the mathematics curriculum, as for the generating or productivity skill of higher thinking skills, it got a percentage of (0.15), and this indicates the learner's ability to go beyond the available information to know what is logical and what is reasonable that can be true, as well as expand in order to add explanations, examples and other relevant information prior knowledge in order to improve the comprehension process, while the skill of integrating or synthesis of higher-order thinking skills, it is guaranteed that it has obtained a percentage of (0.145), and this indicates the importance of this skill, as the student has the ability to combine information in an integrated text manner. It involves summarizing information, selecting what is important, deleting what is not important, and combining logical text dimension, As for the knowledge skill, which is one of the higher-order thinking skills, it obtained the lowest percentage of (0.124), and this indicates that the student enjoys setting goals, defining problems, how questions are formulated, and the learner's ability to store information as well as retrieval it.

As for the evaluating skill, it is one of the higher thinking skills, but it got a percentage of (0.123), and this indicates that the evaluating skill enables the learner to judge the reasonableness of the results that are reached, as well as evaluating arguments and detecting fallacies and errors that can fall into it while solving problems.

As for the organizing skill of higher-order thinking skills, it obtained the lowest percentage, which is (0.113), and this indicates the ability of the learner to identify the similarities and differences between the information given or the information that is being researched and investigated. As well as subjecting the elements or vocabulary to organizing according to a predetermined standard and reformulating the information in a way that shows the important relationships over the available information to know what is logical and what is reasonable that can be true and also expands in order to add explanations.

Second: Conclusions:

The content of the mathematics curriculum for the sixth scientific grade for the academic year 2020-2021 AD contains higher-order thinking skills (knowledge, organizing, applying, analysis, generating or productivity, integrating or synthesis, and evaluation) in varying percentages

Third: Recommendations:

In light of the findings of this research, the researchers suggest some recommendations to those concerned with the content of the mathematics curriculum for the sixth scientific grade, from education officials, those in charge of designing, preparing and planning curricula, and educational supervisors specializing, And teachers to take them when developing the curriculum content by focusing on all higher-order thinking skills. The most important recommendations in this regard are: -

1- Reconsidering the content of the mathematics curriculum for the sixth scientific class in Iraq, So that the topics in it are addressed by enhancing the main higher-order thinking skills and in percentages that ensure that the learner thinks well, correctly and effectively.

2- Holding training courses for mathematics teachers, through which to increase their awareness of the importance of higher-order thinking skills Training them on teaching methods through the approved curriculum content and how to develop them among students and encouraging them to use a variety of teaching strategies, starting from kindergarten to higher school levels.

3- The necessity of establishing faculties of education in Iraqi universities, especially those in charge of them who are specialists in mathematics curricula and methods of teaching it, Increasing interest in the pre-service mathematics teacher, and providing him with a set of higher-order thinking skills and how to develop them among students

4- Enriching the mathematics curriculum with various activities that motivate students to higher-order thinking skills.

Fourth proposals:

In light of the current research results, the researchers suggest some suitable proposals for future studies Which is believed to be complementary to this study as follows:-

1- Conducting a similar study at different educational stages .

2- Conducting a study to reveal the nature of the correlation of the higher-order thinking skills of teachers on the one hand and their students on the other hand.

3- Conducting a study to reveal the nature of the relationship between higher-order thinking skills and other types of thinking, especially meta-cognitive one

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