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Analysis of the science book for last year in the primary school students, first and second semesters.

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Abstract

The aim of this research is to examination of and analyzes the content of the science textbook used in first and second grades during the previous year. The analysis aims to identify the book's strengths and weaknesses, evaluate its scientific accuracy and clarity, and assess its suitability for engaging young learners. The research employs a content analysis approach, involving a thorough examination of two units of the book's content, one in the first semester and the second one in the second semester, language, and pedagogical strategies. The analysis will identify key themes, assess the presentation of scientific concepts, and evaluate the effectiveness of activities and illustrations in promoting student understanding. The findings of this study will be presented in a comprehensive report. This report will highlight areas where the book excels in fostering scientific curiosity and knowledge acquisition. Additionally, it will identify areas for improvement, such as potential inaccuracies, unclear explanations, or a lack of age-appropriate engagement strategies. This study investigates the effectiveness of two curriculum units from a sixth-grade science textbook, one from the first semester and one from the second. The research focuses on student perception and utilizes a questionnaire to

assess their engagement, understanding, and overall learning experience with each unit. By analyzing student responses, the study aims to identify strengths and weaknesses in the curriculum design, particularly in fostering scientific curiosity and knowledge retention. The findings will contribute to discussions on improving science education at the primary level, informing curriculum development and teaching practices that promote a more engaging and effective learning environment for young scientists. This analysis will contribute valuable insights for educators and curriculum developers seeking to improve the quality of science education for primary school students. The identified strengths and weaknesses can inform revisions to the existing textbook or guide the development of future science resources for young learners.

Key Words:

Science textbook evaluation, Constructivism , Content analysis , Learning outcomes , Engagement .

1. Introduction: Our world is constantly changing, and educational systems must evolve to prepare students for this new reality.

The rapid growth of knowledge represents a challenge for teachers who need to develop science curricula that keep pace with this development.

Regularly evaluating and updating science curricula is crucial to ensuring that they remain effective and relevant.

Given its emphasis on knowledge, scientific thinking, and cultural development, science education is a particularly important area for continuous improvement (أحمد عبد الرحمن النجدي،

وآخرون، ٢٠٠٥)

The developing world requires individuals who are able to adapt to scientific and technological advances.

Providing them with life skills is crucial for their personal growth, positive contribution to society, and effective communication. Regular evaluation of the curriculum ensures that it remains relevant, identifies areas for improvement, and enhances its effectiveness in achieving educational objectives. This ongoing process is vital to fostering experienced individuals who can succeed in a dynamic world

(عفت مصطفى الطناوي ٢٠١٥ ، ٣٦٩).

It is worth mentioning, there is a close relationship between education in all its forms and levels, on the one hand, and

development on the other. Education is one of the most influential factors contributing to the development of society and is an essential element of the development guide. From the generations of future will be leaders, thinkers, scientists, and researchers who will change after understanding the pillars of science and progress towards the project of comprehensive sustainable development, which is one of the languages of this age (Al-Shaabani & Yusuf, 2012; Dwikat 2000, 2-4).

One of the most prominent contributions of modern life is the merger between science and technology in an integrated system that makes it hard to separate one from the other. This has affected the nature of the scientific knowledge in a way or another (Lemmer et al. 2008; Laçin-Şimşek 2011, Lavakare 2013)

Textbooks serve as a foundational resource for both educators and learners, guiding the teaching process and providing a common reference point for knowledge acquisition. (Burns,2006; Ivey,2010)

Content analysis consists of two terms, one is Analysis, the other is Content. Analysis is defined as fragmentation or the breakdown of all into parts or vocabulary and linking to its main elements, content refers to the communication material that the

researcher deals with for the purpose of analysis (Al-Jadri & Abu-Helou, 2009, 5)

The curriculum is officially delivered through a designated textbook, which serves as a comprehensive resource. This textbook conveys educational content designed to influence students' development across various dimensions, including applied skills, emotional intelligence, and intellectual capacity, with potential social, economic, and intellectual implications. (Gurung and Martin 2011; Fang 2014).

In this type of analysis, the analysis is based on the information contained in the document or documents analyzed, such as books, magazines, newspapers, laws, television programs, etc.

Often, content analysis is intended to evaluate a document or a television program according to agreed terms, criteria, or standards (Al-Rokaby, 2015).

Content analysis is of great importance, especially as we live in the age of accumulated knowledge, an age of tremendous revolution of informatics, which requires the judging on content and recognizing the extent to which the principles, standards and components that have been developed and quantified are respected (Mohamed & Abdel-Adhim, 2012).

2. The Theoretical Framework

This framework outlines a research approach to analyze a science textbook used by first and second-grade students in the previous academic year.

Research Goals:

Evaluate the textbook's effectiveness in fostering scientific knowledge and inquiry skills in young learners.

Identify areas for improvement to enhance student engagement and learning outcomes.

Theoretical Lenses:

Constructivism: This theory emphasizes the active role of students in constructing their understanding of the world. The textbook's content and activities should be designed to allow students to build upon their prior knowledge and experiences through exploration and experimentation.

Science Process Skills: The textbook should encourage students to develop essential science process skills such as observing, classifying, predicting, experimenting, collecting data, analyzing results, and drawing conclusions.

Learning Theories:

Piaget's Stages of Cognitive Development: The textbook content and activities should be developmentally appropriate, considering the cognitive abilities of first and second graders (concrete operational stage).

Multiple Intelligences: The textbook should cater to diverse learning styles by

incorporating activities that address visual, auditory, kinesthetic, and other intelligences.

Analysis Framework:

Content Analysis:

Alignment with curriculum standards

Scientific accuracy and age-appropriateness of information.

Balance between foundational concepts and engaging activities

Integration of Science–Technology–Engineering–Mathematics (STEM) concepts

Assessment of Learning:

Variety of question types (recall, application, analysis, evaluation)

Opportunities for students to demonstrate their understanding through hands-on activities and projects.

Instructional Design:

Text clarity and organization

Use of visuals (diagrams, pictures) to support comprehension

Incorporation of real-world examples and applications of science concepts

Teacher guides and support materials

Data Collection Methods:

Textbook Review: Content analysis of the textbook chapters, activities, and assessments.

Teacher Interviews (Optional): Gain insights into teacher experiences using the textbook and student responses to the content.

Student Focus Groups (Optional): Gather student feedback on their engagement and understanding of the science concepts presented.

Data Analysis:

Use qualitative and quantitative methods to analyze data collected through textbook review and (optional) interviews and focus groups.

Identify strengths and weaknesses of the textbook based on the chosen theoretical lenses and analysis framework.

Expected Outcomes:

A comprehensive evaluation of the science textbook used by first and second-grade students.

Recommendations for improvement to enhance the learning experience and promote scientific literacy in young learners.

Insights into potential areas for further research on science education in primary schools.

Note: This framework is a starting point and can be adapted based on specific research questions and the curriculum followed in your region.

3. Methods of Research and the tools used

Requirements of the International Student Assessment Program included in science textbooks for the upper grades of primary school in the field of scientific knowledge

competencies and the field of problem-solving skills.

The researcher used frequencies and percentages to find a score that includes science books for the upper grades of the primary stage, sixth grade, and the number of students is 30 students for the requirements of the International Program for Student Assessment in the field of scientific knowledge competencies and the field of skills.

The researcher found that science books included scientific knowledge competencies and problem-solving skills to varying degrees.

Table (1): Result of research of first term in six primary

Question	Excellent	Intermediate	Weak
.....helps preparing , package and transport materials within the cells and transported them out of the cell, all cells allow water to pass through a and into the cell. If too much water enters the cell.	21	9	0
..... discovered the microscope, Living organisms made up of only one cell are called.....	22	5	3
Living organisms with more than one cell are called....., each cell is surrounded by a that protects the and regulates what can enter.	24	6	0
..... is inside the membrane and supports the organelles, each plant cell has a cell wall made of	25	2	3
..... are the powerhouses of the cell, is responsible for controlling cellular activities. These activities include making proteins and dividing to make new cells.	27	1	2
The energy is then used in an organelle called a to make food for the plant,.....converts sugar into energy for the cell.	26	3	1
.....helps in assembling and transporting proteins,.....The surrounding layer of the cell that controls what materials enter and leave the cell.	27	2	1
..... the liquid inside the cell that surrounds the organelles,.....The rigid outside material that surrounds plant cells to give them a definite shape; only found in plants	29	1	0
.....contains chlorophyll and carries out photosynthesis; only found in plants, saclike structures used for storage of nutrients, water, and waste ; in plant cells, large vacuoles contain water.	28	1	1

.....The surrounding layer of the cell that controls what materials enter and leave the cell , The cell is a structure that carries out all its own life activities.	30	0	0
..... are the building blocks of all living things, cells need energy in the form of and	28	2	0
The.....of a cell was discovered through observation of numerous plant cells, The structure of most multicellular organisms is organized into five levels:,,,,	26	4	0
Animals have a variety of cell types, including,, and	23	6	1
Similar cells within organisms that share a common origin and perform the same function are often grouped together to form a, An..... is a group of tissues joined together and involved in performing a particular function.	30	0	0
Cellular respiration takes place in the.....insects have a hard, shell-like covering called an that gives them shape.	26	4	0
This pigment chlorophyll absorbs energy from,both plant and animal cells have organelles to help,, and the cell.	28	1	1
The control center of the cell and is responsible for cell division.....,The small structures inside the cell are called	24	3	3
These cells are the, or, of life on Earth.	27	1	2
The functions as a control center for the organelles, An is a structure within the cell that has a special function.	25	4	1
Number	496	55	19
Percent	87.01%	8.77%	3.3%

From Table (1), the average percentage of the questionnaire is 3.3% the average percentage is 8.77% and the excellent percentage is 87.01%, which indicates achieving the standards at the level required in the science book for the sixth grade of primary school.

Table (2): Result of research of second term in six primary

Question	Excellent	Intermediate	Weak
An..... is a process in which an organism becomes able to live in the environment in a way that enables it to survive,..... of an organism's body are linked to the structure of its body.	24	5	1
.....are anything that a living thing does or the way that an animal acts that promotes survival, Thick fur covers the body of an animal that lives in a cold climate an example of.....	22	6	2
growing toward light an example of....., Migration birds an example of.....	26	4	0
.....is a behavioral adaptation in which animals move from one place to another, usually seasonally, The..... has covered with dense feathers to withstand temperatures to keep it from freezing in the Antarctic.	22	7	1
The....., which lives along the coast of South Africa, has of skin completely devoid of feathers surrounding each of its eyes, to cool its body to withstand temperatures.	21	3	6
..... is a plant that only grows when the days are shorter and the nights are longer, A..... cat does not have any hair or may have only very fine hair.	20	1	9
A..... cat has, hair with varying colors.	20	0	10
Thorns on the stems of some plants an example of, The andare important	18	1	11

stopovers for millions of migratory birds every year, including and			
The Red Sea area includes,.....,..... environments.	27	3	0
Birds migrate to find the best resources for successful,, or at different times of the year.	28	1	1
Animals that migrate face many challenges during their migration journey such as, ,..... ,	22	3	5
The..... are nonliving factors such as,,soil,water availability,precipitation, and temperature. Abiotic factors can influence the and survival of organisms in the ecosystem.	25	3	2
Deserts are some of the most environments on Earth. All deserts have very rainfall.	29	0	1
..... is a very small amount of water far below the surface. Some plants are adapted to these environments with roots to reach the needed groundwater.	30	0	0
The new plants and animals receive from the cells of their parents, and the cell nucleus helps in reproduction, Scientists in one of the most arid deserts on Earth analyzed plant species that grow there.	26	4	0
Number	360	50	49
Percent	80%	11%	9%

It will be clear from Table (2) that the average percentage of the questionnaire is 9% the average percentage is 11% and the excellent percentage is 80%, which indicates achieving the standards at the level required in the science book for the sixth grade of primary school.

4. Results of Research

This study followed the analytical approach. This is to analyze science books in the upper grades of the primary stage in the sixth grade of primary school to determine the degree included in the requirements of the International Student Assessment Program.

Content analysis is one of the appropriate research methods for this type of research, because it identifies the characteristics of textbooks and evaluates them according to previously prepared standards. The analysis will show the integration of the two fields of study, the field of scientific knowledge and the field of problem solving

Prepare a list of the program requirements on a content analysis card and compare it with the concepts covered in science books in the upper elementary grades, sixth grade. After conducting the questionnaire, the following became clear: the percentage of excellent is 87.01%, the percentage of average is 8.77%, and the percentage of poor is 3.3% in first term of six primary which indicates achieving the standards at the level required in the science book for the sixth grade of primary school.

And second term the percentage of excellent is 80%, the percentage of average is 11% and the percentage of poor is 9% which indicates achieving the standards at the level required in the science book for the sixth grade of primary school.

There are many functions that science books in the primary stage seek to achieve, among them what he pointed out, which is that the science book: 1– presents scientific knowledge to learners in an organized and codified manner, which contributes to achieving the desired goals 2– provides the learner with the opportunity for self-learning in a way that suits every... Educated and quick in learning 3– You can have a repository for some other means, , such as pictures and graphs 4– It contains books, questions, and exercises on the topics it presents

5. Interpretation of Results

It includes a detailed explanation, and accurate and logical analysis of the results. The interpretation aims to understand the relations and connections among the variables in the scope of study and to know whether the hypotheses stated are right or wrong.

The interpretation of results is done in the light of previous theories, present scientific evidence and clarification of restrictions that might affect the results.

Moreover, interpretation also includes the statistical interpretation of results including the statistical tests and different analysis used in the study. This will help in understanding the relations among the variables.

Interpretation includes also consideration of results from different perspectives: social,

cultural, historical, and economic that might affect the results.

The interpretation aims to clarify the scientific analysis of results and set them in a wider context to be beneficial in the field of study and the other related fields.

The interpretation should be accurate and comprehensive to enable others to understand the results and get benefits from them in the related fields.

In light of an analysis of the textbook for the sixth grade of primary school in the first and second semesters, the author conducts educational activities in order to provide students' skills in understanding information and searching for information that is not found in the textbook, and that there is an interaction between the teacher and the student, and the teacher asks some questions the students and discuss it with the students to reach a solution, the students discuss the questions posed to them, then the teacher conducts experiments for the students to observe and deduce more concepts in the textbook

The teacher makes the student watch educational videos that explain the importance of the lessons in light of the analysis of the curriculum of the textbook for the sixth grade of primary school. This provides the students with experiences and that there are modifications in the science book in the absence of some information. It was necessary to link science units in a

sequential manner, and that the lessons be arranged in a smooth, simplified, and orderly manner, not randomly, so that students understand the information more, and that the book must provide some information to enable students to understand the curriculum and use brainstorming to think about the answer.

Lack of interaction between the teacher and students in the classroom and the students' inference of illustrative models for some lessons to discover it for themselves, we find that in the science curriculum for the sixth grade of primary school, some lessons are supposed to be simplified so that the students can understand in a correct way.

The activities, videos, and pictures that are found in the textbook are that the students only watch them in the book. The students must use the Internet to watch and practice them, and the teacher must play the videos for the students in order for them to understand them and interact with the teacher to deliver the correct information in an easy way and the experiments found in the book must be applied by students in their scientific lives.

It is necessary for the teacher to present models about the lessons that are found in the textbook and not rely on explanation only. He must use a model or a video to explain, a plan for simplified lessons must be developed

There were some scientists who should have been mentioned in the textbook, but very few scientists were mentioned.

The textbook relies on information and knowledge only, but students need more understanding in order to comprehend the lessons. In some units, the abundance of information leads to a lack of focus, a lack of understanding of that information, and difficulty understanding the curriculum.

The textbook contains a lot of information, and we must Abbreviated many lessons so that students can understand the curriculum.

The results of the study indicated the absence of many important investigative processes, such as raising skepticism Imposing hypotheses, analyzing problems, making expectations, and presenting information in an experimental and incomplete manner.

The results of this study indicate that the content of these books emphasizes information and greatly reduces the activities of investigation and discovery, This may be due to the absence of a guide for the authors to guide them to pay attention to such processes, it may easier for the authors to present the content of the book in an encyclopedic manner than to present it in the form of questions and mental and practical activities that excite the student and make him More positive, this may require and imagination Scientific and artistic skills that are not available to many book authors.

One of the striking things is that the content of the book does not address the biographies of the scientists and their personal and social backgrounds. Rather, it does not mention their names, which casts doubt on the book's role in achieving the goal of students' appreciation for scientists and respecting their efforts for the sake of humanity, which is a goal that scientific education and those responsible for it seek, to achieve it.

Perhaps the results of this study are consistent with the results of a number of previous studies, including study, which showed that the concept of science as knowledge is the most widely used in the content of science books. While the concept of science as discovery appears to a much lesser extent, the concept of science as a way of thinking does not appear in the content at all (Fillman's).

Fillman, D. A. (1989). Biology textbook coverage of selected aspects of scientific literacy with implications for student interest and recall of text information (Doctoral dissertation University of Houston, 1989). Dissertation Abstracts International, 50, 1618-A.

The results of this study are also consistent with the results of the Eltin study, which indicated that the focus is on Investigation of books is limited to the introduction chapters, and is limited or almost non-existent in the rest of the chapters (Elting).

Elting, E. M. (1989). Linguistic Content analysis of the Holt, Rinehart and Winston series of high school biology textbooks: A Longitudinal Study Focusing on the use of inquiry (Doctoral dissertation, Iowa State University, 1988), *Dissertation Abstracts International*, 49, 2606-A.

The results of the study are also consistent with the study of Chiang Soong, which showed that science textbooks give all the details to the students and do not leave them the opportunity to discover and conclude (Chiang Soong).

Chiang – Soong, B. (1989). An analysis of the most used Science textbooks in Secondary Schools in the United States (Doctoral dissertation, The University of Iowa, 1988). *Dissertation Abstracts International*, 50, 913-A.

6. Conclusion

The findings indicate that the content of the science textbook, has neglected many of the sub-issues of each concept, which means there is a weakness in the content of the science textbook for schools and its subjects. In light of the study results, it is recommended that:

- Developing the content of science books for the primary stage in schools the perspective in science books is consistent with mental development.
- Paying attention to linking the topics of science books to the lives of students and highlighting the role of science in

developing and serving society and solving its problems.

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أحمد عبد الرحمن النجدي، وآخرون (٢٠٠٥) اتجاهات حديثة في تعليم العلوم في ضوء المعايير العالمية وتنمية التفكير والنظرية البنائية القاهرة: دار الفكر العربي
عفت مصطفى الطناوي (٢٠١٥) : اتجاهات معاصرة في تدريس العلوم والتربية العلمية القاهرة : مركز الكتاب للنشر