Cypriot Journal of Educational Sciences

Volume 18, Issue 1, (2023) 283-299

www.cjes.eu

Content analysis of the developed science textbook (Collins) for the fourth grade in Jordan in light of the requirements of (TIMSS-2019)

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Suggested Citation:

Kreishan, E. (2023). Content analysis of the developed science textbook (Collins) for the fourth grade in Jordan in light of the requirements of (TIMSS-2019). *Cypriot Journal of Educational Science. 18*(1), 283-299. https://doi.org/10.18844/cjes.v18i1.7360

Received from July 12, 2022; revised from October 6, 2022; accepted from December 20, 2022

Abstract

The study aimed to analyze the content of the developed science book (Collins) for the fourth grade in Jordan in light of the requirements of (TIMSS, 2019) The analysis card was designed in light of the list of requirements of the international study project (TIMSS, 2019), and to ensure its validity and stability. The results of the study concluded The content of the developed science book (Collins) is consistent in terms of the percentages of the main areas of content with the requirements of (TIMSS-2019), where the content areas were distributed in percentages that reached (47.5%) in the field of biology, while this area was mentioned in the standards (TIMSS-2019). By (45%), and in the field of physics, the percentage coincided with the same percentage in the standards of ((TIMSS-2019), which is (35%), while the field of Earth science in the science book was at a percentage of (17.5%) compared to (20%) in the standards of ((TIMSS-2019, and although the percentages of content areas agree with TIMSS-2019 standards, 31 of the content indicators did not appear in the Science Book among the 57 approved indicators in content standards according to TIMSS-2019. Accordingly, the study recommends Continuing to plan science books in Jordan in light of international standards, especially TIMSS standards, and taking into account the inclusion of indicators of content areas concepts in a balanced manner.

Keywords: Content analysis, developed science book (Collins), TIMSS - 2019.

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1. Introduction

The era is witnessing many challenges, especially technological development, the explosion of knowledge, and the spread of the phenomenon of factoring, which greatly affected the philosophy of designing science curricula. And because scientific knowledge is constantly growing, and it is a basic pillar in the process of keeping pace with development, and it is increasingly responsible for issues of society, the environment, science and technology, and because the content of the textbook is one of the basic pillars that reflect the content of the educational process, and it occupies a large part through the attention of those in charge of the educational process. This is evident by working to constantly update and develop it to meet contemporary changes and future challenges. These factors together have contributed to directing the attention of educators towards science curricula more (Mosleh, (2019), and reconsidering the ways of shaping education systems in general, and teaching science in particular; to focus To help learners to adapt positively to changes, to become scientifically and technologically enlightened, by linking science curricula with the issues and needs of society, including the issue of environmental pollution, the use of energy and its sources, and diseases of all kinds, especially since science education is an essential element in the development of scientific culture between generations (Mokman, 2001).

Building the developed curriculum is one of the objectives of the modern educational process through which each learner can learn to become an effective component in line with the requirements of life. The development means re-designing the components of the curriculum, including the content of the book, by introducing everything new to improve the educational process and achieve its goals. To complete the development process, the curriculum must be evaluated by identifying weaknesses and shortcomings and trying to get rid of them. It is linked to the employment of modern technologies and communication technologies with content and works to benefit from educational experiences and trends to replace weakness with what is appropriate, and it has an impact on the nature of society, culture and activities (Hassan, 2012). The importance of content is due to the fact that it is the most visible component of the curriculum, and it also receives special attention in selecting its experiences, organizing and applying them. Content as an element of the curriculum is meant: “The set of educational experiences that we provide through the courses prepared by the educational institution for learners to study and help them grow” (Mahmoud, 2006, p. 246).

There are many recent trends to organize integrated curricula for science, including: Introduction to scientific concepts; Which is one of the most important entrances to organizing content, as it directs the educational activity towards studying the main scientific concepts, which follow the spiral curriculum, which helps to review what they have learned from the transfer of sciences, and then build on it new knowledge; In order to increase this knowledge in depth and breadth during the educational level to a higher level; This helps to transfer the effect of learning. To succeed in organizing the experiences of the integrative curriculum, the main concepts and principles are first identified, then a number of facts are selected that help students to form concepts higher than them, so that the concepts constitute a factor that motivates students to analyze and synthesise (Al-Anazi, 2012).

Therefore, the role of scientific education is seen as a way to develop learners' use of science and technology in developing various aspects of their lives (Qelada, 2002). (Zeitoun, 2010) stated that reforming and developing education in general, and the content of science books and their teaching in particular, has become a national priority in many countries, including Jordan, as educators seek to evaluate and reform it. Because the current era is full of amazingly rapid changes

in all aspects. Competition between countries for ideas and research included; which directed those with experience to work on reforming scientific education and the content of science books to suit the challenges of the times, and to reach a high level that would enable it to compete globally in the field of innovation. The excellence and superiority of countries depends on the level of quality of education they provide to their children for their development in all fields.

Science teachers in the twenty-first century face a large number of issues related to science teaching, the most important of which are the appropriateness of textbooks, classroom resources, teacher preparation and qualification, and other issues related to meeting standards, and accelerating the use of the Internet as a source of information (Anderman& Sinatra, 2008). Therefore, Osborne (2007) asserts that science education requires equivalence of knowledge and understanding of educational content, and scientific methods of investigation, with the understanding that science is a social project. To ensure our future, we must educate individuals to live life and work with dignity in society, and the primary goal of science education must be based on conceptual, mental and value fields, with emphasis on the need to develop students' abilities to reasoning and scientific thinking.

This reality holds educational decision-makers in various countries of the world responsible for following up on the amazing developments and changes with flexibility and rationality, in order to raise a capable generation capable of facing the challenges of the age and interacting positively with its data, and contributing to the production of knowledge and its use in various scientific fields. This is what prompted educators to focus their attention at the beginning of the twenty-first century on establishing the concept of scientific culture in which knowledge is integrated between science, mathematics and technology, to qualify individuals to be able to match their skills with the requirements of the twenty-first century (Al-Titi and Al-Ayasra, 2009).

Obaid (2004) mentioned that educational trends began to develop curricula, which start with behavioral objectives, then learning outcomes, and then a culture of standards emerged. And educational institutions competed in setting the standards that the child must realize during the stages of his studies. Children have a natural curiosity about the world and their place in it. Learning science in the elementary grades builds on this curiosity and leads students to a systematic inquiry about the world in which they live. As their understanding of science advances, students in the lower secondary grades are rapidly able to make decisions about themselves and their world, and, like adults, they become informed citizens, able to distinguish science fact from science fiction and understand the scientific basis for important social, economic, and environmental issues. There is a growing demand for those qualified to work in science, technology, and engineering professions that drive innovation and professionalism critical to economic growth and an improved quality of life. To achieve this demand, it is very important to prepare a group of distinguished students to study science (TIMSS, 2019).

In this regard, in the eighties of the last century, more than (300) reports were issued with the aim of reforming educational curricula in America, containing many recommendations and proposals for reforming science curricula to keep pace with scientific development. Among the most important projects to reform science curricula are the Science, Technology and Society Project, and the Science for All Americans Project, Project (2061), which aimed to help learners gain a scientific culture related to the knowledge and skills that students are supposed to acquire in science, mathematics and technology, then the Field, Sequence and Coordination Project, and the Standards Project The National Science Education (NSES), the National Educational Objectives, and other projects. Based on the National Science Education Standards prepared by the National Science Teachers Association

(NSTA), these standards have been adopted in the Global Directions for the Study of Science and Mathematicsproject (TIMSS-2019) (Al-Arja, 2009; Al Fahidi, 2011).

It follows up on the project of the International Commission (IEA), which is considered one of the largest international educational organizations concerned with achievement studies, and that body was established in the year 1959, and it is based in the Netherlands. In the year (1965) the commission conducted the first international study in mathematics, which was known at the time as (FIMS), and in the academic year 1970/1971 the learner's achievement was evaluated in six subjects, including the general sciences. The studies of science and mathematics remained one of the most important priorities of the International Commission for the Evaluation of Academic Achievement, and in 1983/1984 the Second International Study in Science (SISS) was conducted with the participation of (24) countries at that time. In the year 1990, the authority decided to move towards evaluating the learner's performance in science and mathematics periodically every four years, and it was implemented for the first time in 1995 and was known as (TIMSS), and the latest was the International Study of Mathematics and Science in 2019, and it was implemented on eighth grade students in (39). One of the 10 Arab countries, which aimed to improve teaching and learning in mathematics and science by providing data on students' achievement in different educational systems, various teaching practices and different school environments. The International Study of Mathematics and Science for the years 2003, 2007, 2011, and 2015 were applied to both eighth and fourth grades students. In 1999, the study was applied to eighth grade students only, and in 1995, it was applied to fourth and eighth grade students. The international body of these studies aimed to determine the levels of student achievement in different countries of the world in mathematics and science for the fourth and eighth grades, to help the concerned countries in developing its educational systems, thus obtaining indicators that help it improve the learning and teaching of science and mathematics (IEA, 2011).

Jordan topped the list of the ten countries that showed an improvement in the percentage of students who reached the acceptable level of performance in mathematics. The amount of improvement was (15%), while the amount of improvement in science was (9%), and this is what prompted the researcher to conduct this study, especially that the science curriculum in the fourth grade represents a starting point and a transformation for the upper basic stage. The participation of fourth grade students was excluded despite the importance of this stage and the importance of science for the learner in the later educational stages. This is all in order to determine the extent to which the science curriculum for the fourth grade meets the requirements of international standards in science education in accordance with the requirements of the (TIMSS) project, and the following table (1) illustrates this.

Table 1: Requirements for the Study of International Trends (TIMSS) for the year 2019 according to the content field

Percent	Fourth grade content fields
45%	life sciences
35%	physics
20%	Earth and space sciences

The study project in (2011) emphasized the need for the content of the developed science book for the fourth grade to include three fields: biology by 45%, physics by 35%, and earth science by 20%.

1.2 The study Problem

The educational system in Jordan has developed a set of plans and solutions to the problem of the decline in the performance of Jordanian students in the international test (TIMSS)). Among these solutions is the adoption of international standards in curriculum planning, including the science curriculum, in addition to the use of some international curricula such as the Collins curriculum. I started applying the developed science book (Collins) for the fourth grade in the academic year 2019/2020, so this study came to assess the consistency of this book With TIMSS-2019 standards and the main fields of these standards, including sub-fields and cognitive and skill indicators. Therefore, the researcher sought to conduct this study to identify the extent to which the content of the developed science book (Collins) for the fourth grade in Jordan includes fields of science content in accordance with the requirements of the international study project (TIMSS)?

Specifically, the study attempted to answer the following question:

To what extent does the content analysis of the developed science book (Collins) for the fourth grade include science book content standards in light of TIMSS requirements for 2019 in Jordan?

The importance of this study lies in:

First: The current study acquires its importance in terms of its topic, which deals with analyzing the content of the science book for the fourth grade in Jordan according to the standards of the (TIMSS) project to know the extent to which it takes into account global standards and trends in preparing it and designing its content.

Second: Providing decision-makers in the Ministry of Education and designers of science curricula with the results of the study, to rely on them in developing the science book (Collins), the fourth grade, in line with contemporary trends.

1.3 Purpose of the Study

The study aimed to analyze the content of the developed science book (Collins) for the fourth grade in the light of the TIMSS project for the year 2019 in Jordan to determine the aspects of compatibility and differences between them in the content field.

1.4 Procedural definitions

Content analysis: It is the research method followed by the researcher in analyzing the topics included in the developed science book (Collins) for the fourth basic grade approved in Jordan and describing them quantitatively and qualitatively according to the three content fields, which include (biology, physics and earth sciences).

The Developed Science Book (Collins): It is the science textbook for the fourth grade students in Jordan after contracting with Collins Company by the Ministry of Education for the academic year 2019/2020.

The requirements of (TIMSS 2019: Mathematics) and (Study Trends of the International Science), which represent standards for building educational content for science subjects, adopted by the International Commission to Field Science Education. The content includes: Biology 45%, Physics 35%, and Earth sciences 20%.

2.Theoretical framework

Today, more than ever, there is a need to evaluate reality in order to launch a comprehensive development process for the educational system and keep pace with contemporary developments. Perhaps the most prominent curricula that require evaluation and development at the current stage

are the science curricula. This is due to the global developments and transformations that impose themselves strongly on any educational system.

The Study of International Trends in Science and Mathematics (TIMSS) is one of the most widely and most popular studies, as it started in its new model starting in 1995, and the TIMSS Assessment Framework for Science for 2019 (TIMSS) for the fourth and eighth grades continued for 24 years in the TIMSS exams, 2019, where it is conducted every four years Since that date (Mullis and Martin, 2017).

In general, the framework for evaluating science for TIMSS (2019) is similar to the framework used in (TIMSS, 2015) except in some topics that better reflect the curricula of the participating countries as indicated in the Encyclopedia (TIMSS, 2015).

The main objectives of the TIMSS test:

The (TIMSS) study seeks to compare the achievement of students through following different educational systems in order to reach the factors influencing the outcomes of these systems, as mentioned by Mullis, 2017, p6) that the study of (TIMSS) comprehensive concepts taught by students about the concepts and access to the data that: Science and Mathematics in the fourth and eighth grades, observing the relative influences of teaching and learning in the fourth grade and following up for comparison with those influences in the eighth grade. A group of students in the fourth grade will be tested in one session, and in the future they will be tested in the eighth grade in the next session, in addition to comparing students' results in science and mathematics by following different educational systems in their cultural, economic and social references, then arriving at the most important and best means leading to Better education by comparing the test results of a country with the results of other developed countries in the context of the applied educational policies and systems that lead to high achievement rates for students.

Results of Jordan's participation in TIMSS 2015 tests

The study presented the results of Jordan's participation in the 2015 TIMSS test cycle, which was published by the Jordanian National Report on International Studies for Science and Mathematics. The results were as follows: A sample of eighth grade students, selected from public and private schools and UNRWA schools, participated in the TIMSS tests (2015). The number of participating countries was (39) countries, including 11 Arab countries: Jordan, Egypt, Morocco, Bahrain, Saudi Arabia, Qatar, Oman, Kuwait, Lebanon and the UAE. The average student performance in science reached (426) degrees compared to the international average (486) degrees, and the average of the first country (597), which is Singapore, and Jordan ranked (32) among the participating countries. At the level of Arab participation, Jordan achieved the fifth rank, and the average performance of Jordanian students in science did not differ from the Arab average (425) degrees. As for the average performance on the four test fields, it was as follows: Earth sciences (416) degrees, Biology (420) Degree, Physics (424) degrees, Chemistry (438) degrees, all of which are below the state average (486) degrees.

Results of Jordan's participation in TIMSS 2019 tests:

A sample of eighth grade students, selected from public and private schools and UNRWA schools, participated in the TIMSS tests (-2019) and the number of participating countries in the eighth grade was 39 countries, and the participating Arab countries were: Jordan, Egypt, Morocco, Bahrain, and Saudi Arabia , Qatar, Oman, Kuwait, Lebanon and the UAE. The science questions included a

variety of questions that covered the fields of: earth sciences, biology and physics. The average student performance in science reached (452) degrees compared to the international average (490) degrees, and the average of the first country (608) degrees, which is Singapore, and Jordan ranked (31) among the participating countries. At the level of Arab participation, Jordan achieved the fifth rank. The average performance of Jordanian students in science is higher than the Arab average (439 degrees). As for the average performance on the four test fields, it was as follows: Earth sciences (428 degrees), Biology (457degrees), Physics (449degrees), Chemistry (454degrees) National Center for Human Resources Development, (2020).

When comparing the results of this course with the results of the (TIMSS, 2015) course, we found an increase in the average scores of students in science by mean of (26) degrees, as the improvement in the average performance of students in Jordan was evident in the international study (TIMSS, 2019) in the mathematics and science subjects for the class VIII.

From the above it is concluded the importance of participating in TIMSS tests; The contribution of its results to the development of appropriate educational plans to raise the level of science and mathematics education and teaching for the participating countries, and the comparison between the results highlights the weaknesses in the educational policies of the countries with low results as well as the strengths of the countries with advanced results. Test standards represent great intellectual efforts for their authors seeking to develop how to deal with science and mathematics.

2.1 Related Research

A number of studies related to the subject of the study were referred to, arranged chronologically from newest to oldest:

The study of Al-Salameen (2019) was conducted for the science curriculum (Collins) for the fourth grade from the point of view of teachers and educational supervisors, in the fields of the curriculum: objective, educational content, evaluation, activities, teaching methods, presentation, and artistic design. The study used the qualitative research method, and the study population consisted of all fourth grade science teachers and educational supervisors in the districts of Ma'an Governorate. The researcher also used the objective analysis method to analyze the data. The results of the study showed that the evaluation of the science curriculum (Collins) in all fields came with a high level of suitability at a rate of (34%), and a percentage of (25. 27.%) with a medium suitability level, while the low level was (29.57%) as the fields of activities and teaching methods achieved the highest level of suitability, while the fields of the objectives and educational content achieved the lowest level of suitability. The study also showed that religious and social foundations were not included in the curriculum, and a gap in the integration of the science curriculum and the developer (Collins).

Khattaba (2018) conducted a study aimed at determining the requirements of (TIMSS-2015) that must be met in the content of the Jordanian science book for the fourth grade in its parts, and the extent to which it includes the requirements of (TIMSS-2015) in the field of the topics (biology, physics, earth and environmental sciences) through content analysis, And after the cognitive processes (knowledge, application, inference) from the teachers' point of view; The descriptive analytical method was used. The study population included a science book for the fourth primary grade, and science teachers for fourth-grade students in the Directorate of Education in Irbid Governorate. The researcher used two tools, the first is a list of requirements for the study of international trends in science (TIMSS-2015) and the second is a questionnaire to measure the science teachers' viewpoint on the field of cognitive processes. It was found that there is a medium degree to include the content of the Jordanian science book developed for the fourth grade in the basic

cognitive field (knowledge, application, inference) from the teachers' point of view. The study recommended the necessity of including all fields in a manner commensurate with the requirements of international trends for the study of science (TIMSS-2015).

Al-Juhouri and Al-Kharousi study (2010) evaluated the analysis of the content of the science book for the eighth grade in the Sultanate of Oman in light of the requirements of the International Trends in Mathematics and Science (TIMSS),with 37.8%, chemistry 12.7%, and earth sciences with 8.1%. As for the field of mental operations, inference constituted 49.9%, then knowledge by 36%, and finally application by 14.1%. The researchers recommended the need to benefit from the results of the analysis in developing the science book for the eighth grade.

Al-Arja (2009) conducted a study that aimed to identify the level of content quality of the science book for the eighth grade in Palestine in light of international standardsfor the year (2003). The results of the study showed that the subjects of the course covered physics by (26.3%), earth sciences by (7.9%), biology by (31.2%), and chemistry by (34.5%). The study also showed that there are statistically significant differences at the significance level α≤05.0 in the level of scientific knowledge acquisition between males and females in favor of females.

Murdock (2006) conducted a study aimed at identifying the degree of depth, breadth, and repetition of the curriculum, and its relationship with achievement in physics in the TIMSS test, and comparison with the physics curriculum in America and some other countries participating in the test. The results of the study showed that the physics curriculum in America met the standards of width and breadth at a low degree, while it achieved the standard of repetition at a high degree, and that the depth of the curriculum was the only variable that had a correlation with achievement in physics. The researcher recommended the necessity of changing the physics curriculum in America.

There is an interest in the necessity of observing international standards in designing science curricula, especially in the Arab region, and this interest stems from the participation of many Arab countries in the TIMSS test. Therefore, many studies have been conducted on the compatibility of science curricula with TIMSS requirements, including: Al-Khatahtbeh'sstudy (2018), and the study of Al-Jahouri and Al-Kharousi (2010), and Al-Arja (2009).

The results of the studies that were based on content analysis or analysis of results in the light of the content showed that there is a discrepancy in meeting the requirements of TIMSS) related to general sciences in the elementary grades, and among these studies are the study of both the study of Al-Jahouri and Al-Kharousi (2010), Al-Arja (2009), and the study of (Murdock, 2006).

The current study agrees with previous studies in fields and analysis tools, and the researcher has benefited from them in preparing the theoretical framework and study procedures.

2.2 Study Approach

To achieve the goal of the study, the researcher used the descriptive analytical approach based on analyzing the content and presenting its components in the content field according to the requirements of the project. TIMSS

The content of the general science book for the fourth grade may consist of two parts (the first and second), which are approved and applied in Jordanian schools, where the two parts include (10 units of study and (20) subjects. They are distributed as in the following table 2.

Table 2. Subject units of the general science book for the fourth grade in Jordan

Unit Title	Unit
Classification of plants and animals	first
Reproduction and life cycles of living things	second
Relationships between living things	third
The human body and health	fourth
Material	Fifth
the light	Sixth
earth movement	Seven
strength and energy	eight
electricity	ninth
Natural resources in the environment	tenth

2.3 Research Method

The researcher built a content analysis card according to the following steps:

1- The list of (TIMSS) standards for 2019 was obtained from the website of the International Association for Assessment of Achievement (IEA), in the two content fields.

2- The main topics were organized in a list, and they were divided into three fields: (Biology, Physics, and Earth Science).

3- Analysis Categories: The analysis categories in the study cover all requirements of the 2019 TIMSS project in the content fields they cover.

4- Unit of analysis: The researcher chose the paragraph as a unit of analysis on which the categories of analysis depend, and the paragraph means a sentence or more that includes one idea, so that it monitors the field of the paragraph's belonging to the content it covers.

2.4 Validity of the analysis instrument:

In its initial form, it was presented to a group of experts and specialists. The specialists made a number of observations, and the arbitrators' observations were taken into account. Thus, the study tool has achieved the criterion of validity as it was also originally prepared by the International Association for Assessment of Achievement (IEA).

2.5 Reliability of the analysis instrument:

The researcher analyzed randomly selected units from the target book and monitored their results, and after three weeks the second analysis was conducted, according to the reliability coefficient.

3. Results and Discussion

Answer and discussion of the study question: The question states: "To what extent does the content analysis of the developed science book (Collins) for the fourth grade include the content standards of the science book in light of the requirements of (TIMSS 2019 in Jordan?"

To answer this question, analyze the content of the developed science book (Collins) for the fourth grade in Jordan according to the requirements of TIMSS for the year 2019 using the table prepared for

this purpose. The frequencies and percentages of each field of content were calculated and the following table 3, illustrates this.

Table 3. Frequencies and percentages of content fields included in the fourth grade science book according to the requirements of the TIMSS project for the year 2019

Rank	%	Frequencies	field content
First	%47.5	79	Biology
Second	%35	58	physics
Third	%17.5	29	Earth and space sciences
	%100	166	Total

From the table, shows that the three fields of the content field were included in the general science book for the fourth grade in different proportions. Biology ranked first with a percentage of (47.5%), which is slightly higher than the requirement of (TIMSS-2019), and physics came in second place with a percentage of (35%), and this percentage is equal to the required percentage of the requirements of (TIMSS-2019). As for the third place, the field of earth science came with a rate of (17.5 %), which is slightly less than the percentage required for the requirements of (TIMSS-2019), there were indicators that were not mentioned in the decided book, although they are within the educational content in accordance with the requirements of the project (TIMSS-2019). It relates to the three fields in the Book of Science, and Table 4, explains this in detail.

Table 4. the contents of the content of the developed science book (Collins) for the fourth grade in Jordan according to the requirements of the (TIMSS) project for the year 2019 in the field of biology

%	Frequencies	Field one: Biology
First: the characteristics of living organisms and the biological processes that they perform		
%0	0	1- Distinguish between living organisms and non-living objects (example: all living things can reproduce, grow, respond to environmental stimuli, and die, while non-living things cannot do so).
%26.5	21	2- Determine the needs of living organisms that keep them alive (ie, air, water, food, and the environment in which they live).
%0	0	3- A comparison of the physical and behavioral characteristics that characterize the main groups of living organisms, arthropods, birds, mammals, fish, reptiles and flowering plants.
%0	0	4- Know and give examples of living organisms belonging to the main groups of plant and animal kingdoms (arthropods, birds, mammals, fish, reptiles and flowering plants).
%16.5	13	5- Distinguish between vertebrates (animals that have a backbone) and invertebrates (animals that do not have a backbone).
%0	0	6- The link between the main structures of animals and their functions (example: how teeth break food, bones support the body, lungs absorb air, stomach digest food, heart distributes blood, muscles move the body).
%0	0	7- Linking the main structures in plants with their functions, for example: (the roots absorb water and

		nutrients and stabilize the plant, the leaves make food, the stem transports water and food, the petals attract pollinators, the flowers produce seeds, and the seeds produce a new plant).
Second: the life cycle of living organisms, reproduction and genetics		
%16.5	13	1- Knowing the stages of the life cycle of plants i.e. germination, growth and reproduction, and seed dispersal.
%0	0	2- Compare and contrast the life cycle of familiar plants and animals, for example: trees, beans, humans, frogs, and butterflies.
%10.1	8	3- Identify plants and animals of the same species that reproduce to produce offspring with characteristics that closely resemble the parents.
%0	0	4- Determine the characteristics of plants and animals inherited from their parents (such as: the number of petals, the color of the petals, the color of the eyes) that are not inherited from the parents (such as: some branches broken in the eyes, the hair color of the tree, the length of human hair).
%7.6	6	5- Describe the different strategies that increase the number of offspring to survive for example; A plant that produces a lot of seeds or mammals care for their young.
		Third: The interactions of living organisms with ecosystems and the characteristics of each of them.
%0	0	1- Relate the physical traits of plants and animals to the environments in which they live, and describe how these traits help them survive (eg, thick stems, waxy coats, and deep roots help the plant survive in a low-water environment; animal coloration helps camouflage it from predators).
%6.3	5	2- Link between the behaviors of animals and the environments in which they live and then describe how these behaviors help them to survive (for example: migration and moving from one place to another, or hibernation when food is scarce).
%0	0	3- Distinguish how plants respond to environmental conditions (eg the amount of water available and the amount of sunlight available).
%0	0	4- Describe how different animals respond to environmental changes (eg light, temperature, danger; know and describe how the human body responds to high and low temperatures, exercise and danger).
%0	0	5- Distinguish that there are negative and positive effects of human behavior on the environment (for example: negative effects on air and water pollution, benefits of reducing air and water pollution; describe in general and give examples of the impact of pollution on humans, plants, animals, and the environment around them).
Fourth: Environmental Systems		
%0	0	1- A link between common plants and animals (for example: lions, frogs), evergreens and common ecosystems (for example: forests, ponds, and pastures).
%7.6	6	2- Knowing that all plants and animals need food to provide the energy needed for activity, and they need raw materials for growth and repair; To explain that plants need sunlight to make their own food, while animals eat plants or other animals for their food.
%0	0	3- Complete a simple food chain model using common plants and animals from familiar societies, such as a forest or desert.
%0	0	4- Describe the role of living organisms according to their link in the simple food chain (for example, plants produce their own food, some animals eat plants, while other animals eat animals that eat plants).

%1.3	1	5- Identify common predators and their prey.
%2.5	2	6- Explain that some organisms in an ecosystem compete with other organisms for food or a place to live.
		Fifthly: human health
%2.5	2	1- Linking the transmission of common infectious diseases to human contact (eg touching, sneezing, and coughing).
%1.3	1	2- Describe some ways to prevent disease transmission (eg vaccination, washing hands and avoiding sick people), recognizing common signs of illness (eg high body temperature, coughing, and stomach pain).
%1.3	1	3- Describe daily behaviors that promote good health (eg: eating a balanced diet, exercising regularly, brushing teeth, getting enough sleep, wearing sunglasses); Identify common food sources to be included in a balanced diet (eg fruits, vegetables, legumes).
%100	79	Total

It is evident from Table 4, that the content of the science book for the fourth grade in Jordan covered the field of biology by (47.5%) of the content, which is higher than the percentage required in the (TIMSS) project for the year 2019. The indicator "Determining the needs of living organisms that survival (i.e. (air, water, food, and the environment in which they live)" at the highest rate (26.5%), followed by the topic "distinguishing between vertebrates (animals that have a backbone) and invertebrates (animals that do not have a backbone), and the indicator (Knowing the stages of the life cycle of plants, i.e. germination, growth, reproduction, and seed dispersal), which amounted to (16.5%), followed by the topic of (identifying plants and animals of the same species that reproduce to produce offspring with characteristics that are very similar to the parents, which amounted to (10.5%). As for indicators (identifying common predators and their prey) (describing some methods of preventing disease transmission, recognizing common signs of disease), (describing daily behaviors that promote good health (example: following a balanced diet, regular exercise, brushing teeth, get enough sleep, wear sunglasses); identify the sources of For the common food included in a balanced diet (at the lowest percentage (1.3%), as well as classification and properties of matter and its changes such as (distinguishing between living organisms and non-living bodies, comparing the natural and behavioral characteristics that distinguish the main groups of living organisms, determining the characteristics of plants and animals inherited from their parents), while there are (14) indicators that were not mentioned in the developed science book (Collins).

Table 5.the contents of the content of the developed science book (Collins) for the fourth grade in Jordan according to the requirements of the (TIMSS) project for the year 2019 in the field of physics

		The second field: physics
%	Frequencies	First: Classification and properties of material and its changes
%0	0	1- Describe the three states of material (for example: a solid has a definite shape and a definite volume, a state that determines a liquid has a definite volume and an indefinite shape, and a gaseous state that has no definite volume or shape).
%13.8	8	2- Comparison between objects and materials based on physical properties (for example: weight/mass, volume, state of the material, the ability of the material to conduct heat or electricity, the ability of the material to float or sink in water, the material's susceptibility to being affected by magnets). Note: Students in fourth grade are not expected to distinguish between weight and mass.

%5.2	3	3- It defines the properties of metals (example: conductors of electricity and conducts heat) and links these properties to the uses of metals (examples: copper electric wires, iron cooking pots).
%0	0	4- Describe examples of mixtures and how mixtures can be separated by physical methods (e.g. using sieve, filtering, evaporation, magnetic attraction).
%1.7	1	5- Knowing that magnets have north and south poles and that similar poles repel and different poles attract.
%0	0	6- Knowing that magnets can attract some metal objects.
%0	0	7- Determine the observed changes in materials that do not result in new materials with different properties (eg: melting, crushing of aluminum can).
%0	0	8- Knowing that a material can change from one state to another by heating or cooling; Describe changes in the state of water (eg: melting, evaporation, condensation, boiling, freezing).
%0	0	9- Determine methods that increase how a solid is dissolved in an amount of water (example: an increase in temperature, stirring, and breaking a solid into small pieces); Comparison of strong and weak concentrations of simple solutions.
		Second: Forms and methods of energy transfer
%19	11	1- Determining energy sources (example: sun, running water, wind, coal, oil, gas). He distinguishes that energy is needed to move objects, as well as for heating and lighting.
%19	11	2- Relate familiar physical phenomena (shadows, reflections, and colors of the spectrum) to the behavior of light.
%0	0	3- Relate familiar physical phenomena (eg echo and body vibration) with sound production and sound behaviour.
%0	0	4- Distinguish that hot bodies have a higher temperature than cold bodies; Describe what happens if a hot object comes into contact with a cold object (eg the temperature of the hot object will decrease and the temperature of the cold object will increase).
%5.2	3	5- Knowing that electrical energy in an electrical circuit can be transferred and transformed into other forms of energy (example: heat, light, sound)
%13.8	8	6- Explanation that simple electrical device (example: lamp light requires a closed electrical path without interruption).
		Third: force and Motion
%1.7	1	1- Determine that gravity is a force that attracts objects to the Earth.
%20.7	12	2- Knowing that the force (pulling and pushing) may have caused a change in the motion of the body; Comparing the effect of different forces in value and direction (same and opposite direction) on objects; Then distinguish that the force of friction works in the opposite direction of the movement (for example: the force of friction works against the push or pull, which makes it difficult and impedes the movement of the body on a surface).
%0	0	3- Knowing that simple machines (eg: winches, pulleys, gears, inclined planes) make the movement of objects easier (eg: make lifting weights easier, reduce force, change distance, change direction of force).

%100	58	Total

It is clear from Table 5, that (the content of the science book for the fourth grade in Jordan covered the field of physics with a percentage of (35%) of the amount of content, which is an equal proportion to the percentage required in the (TIMSS) project for the year 2019. Push and pull may have caused a change in the movement of the body; comparing the effect of different forces on the value and direction on the bodies; then distinguishing that the friction force works in the opposite direction of the movement) at the highest percentage (20.7%). (Knowing that magnets have north and south poles and that similar poles repel and different poles attract), and an indicator (determining that gravity is a force that attracts objects to the Earth). There are also 9 indicators that were not mentioned in the developed science book (Collins).

Table 6. Contents of the content of the developed science book (Collins) for the fourth grade in Jordan according to the requirements of the (TIMSS) project for the year 2019 in the field of earth science

Percent	Frequencies	Third field: Earth and space sciences
		First: The natural characteristics of the land, its resources, and its history
%0	0	1- Knowing that the Earth's surface consists of land and water, but in different proportions, as the proportion of water is higher than the land and that the Earth's surface is surrounded by the atmosphere; He described the availability of potable water, and salt water, and he knew that the water running in rivers and streams comes from mountains and pours into lakes or oceans.
%62.1	18	2- Determining some of the earth's resources that are used in our daily life, for example: water, wind, soil, forests, petroleum, natural gas, and metals.
%6.9	2	3- Explain the importance of using the Earth's renewable and non-renewable resources responsibly (eg fossil fuels, forests, water).
%0	0	4- Knowing that wind and water change the terrain and characteristics of the earth's surface, for example: mountains, river valleys, and they are the result of changes that occur very slowly and over a long period of time.
%0	0	5- Knowing that the remains of fossils of animals and plants that lived on the earth a long time ago were found in the rocks, and it gave simple indications and conclusions about the changes on the earth's surface in the place where these remains were found.
%0	0	6- Apply knowledge of water condition changes to common atmospheric changes (eg cloud formation, dew formation, evaporation of water bodies, snow, and rain).
%0	0	7- Describe how the weather condition, for example: the daily change in temperature, humidity, precipitation in the form of water or snow, clouds, and winds can change according to geographical location.
%0	0	8- Describe how the average temperature and precipitation can change according to the seasons and geographical location.
		Second: Planet Earth in the Solar System
%0	0	1- Knowing that the sun is the source of heat and light in the solar system; Then the solar system is described as the sun and a group of planets revolving around it.

%0	0	2- Distinguishing that the earth has a moon revolving around it, and when seeing the moon from the earth, the moon appears in different shapes at different times throughout the month.
%17.2	5	3- An explanation that the earth and the day are linked to the earth's rotation on its axis on a daily basis, and to provide evidence that this rotation is one of the changing appearance of shadows during the day.
%13.8	4	4- Describe how the seasons in the northern and southern hemispheres are related to the Earth's annual movement around the sun.
%100	29	Total

It is also evident from Table 6, that the content of the science book for the fourth grade in Jordan covered the field related to the field of earth and space sciences with a percentage of (17.5% of the amount of content, which is slightly less than the percentage required in the (TIMSS) project for the year 2019). The highest percentage of the topic (identifying some of the earth's resources that are used in our daily life), which amounted to (62.1%), and the lowest percentage of (6.2%) in the indicator (interpreting the importance of using the earth's renewable and non-renewable resources responsibly) while there is ((8 indicators not mentioned in the developed science book (Collins).

The results of the study showed that the percentages of arrival of the main content fields with the standards of (TIMSS-2019), but that 31 of the content indicators did not appear in the Science Book among the (57) indicators approved in the content standards according to (TIMSS-2019). This may be due to the fact that the designers of the Collins curriculum have prepared these curricula according to standards approved by them as a body concerned with developing curricula. It has been found that these standards are consistent with TIMSS-2019 standards in the percentages of mention in all of the main fields in the book, but there was a discrepancy in the sub-indicators compared to the standards approved in (TIMSS-2019.

The presence of many indicators (TIMSS-2019) in the content of the developed science book can be explained by the fact that these indicators were exposed to the main concepts in the content such as concepts of living organisms, concepts of earth and space sciences, concepts of classification and properties of matter and changes directly, while the lack of some indicators may be attributed to their inclusion In science books for previous or subsequent grades, some of these indicators have been exposed to examples and applications related to the main concept, but they do not fit the culture of Jordanian society.This indicates comprehensive knowledge of science curricula and books by the curricula development committees in Jordan, and the results of the current study agree with the results of studies Both Murdock (2006), Al-Arja study (2009) and Al-Ghouri and Al-Kharousi study (2010).

4. Recommendations

In light of the results of the study, the researcher recommends taking advantage of the results of the study in:

1- A comprehensive development of the content of the developed science book Collins for the fourth grade in Jordan.

2- Continuing to plan science books in Jordan in light of international standards, especially TIMSS standards, and taking into account the inclusion of content fields indicators in a balanced manner.

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