



## Research Article

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# Analysis of Mathematical Operations Content for Grades (4<sup>th</sup>, 5<sup>th</sup>, and 7<sup>th</sup> Grades) Books in Jordan According to the Standards of Mathematics NCTM (2000)

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## Abstract

*The study aimed to investigate the extent of mathematical operations containment in mathematics books for the basic stage in Jordan in light of the National Council of Teachers of Mathematics Standards (NCTM, 2000), concerning the mathematical operations (NCTM, 2000). That is by employing the descriptive approach. The study sample consisted of all mathematics books for grades: Jordan's first and fourth basic grads. The study had been conducted in the second semester of (2020\2021) results of the operations in these books. The standards ratios were: %32, %33, %38, %38, and %39 for problem-solving, thinking, relations in mathematics, representation, and communications. In light of these results, the study recommends increasing the induction of mathematics books for the grade (4<sup>th</sup>, 5<sup>th</sup>, and 7<sup>th</sup>), the standards of mathematical operations for their significance in this stage in developing the mental abilities of the child, developing its mathematical skills, and enhancing its mathematical thinking.*

**Keywords:** content Analysis, Mathematical operations, standards of (NCTM, 2000), Books of mathematics for the essential basic stage (1-4) in Jordan

## 1. Introduction

Technology became the spinal cord for our contemporary life; its impact on human life increased day by day, which led to a great and radical change in the multi-life patterns. It showed the need to review the objective of education, its structure, content, methods, and means. The matter that requires humoring the educational methods of this development, more ever their development became a national necessity, because of the qualitative step the world witnesses.

This study attempts to tackle the reality of carrying out the mathematics curriculum to develop teaching in Jordan from quality. This assists the student in obtaining the concept and great mathematical skills with meanings that let him be able to solve problems and related matters with the daily needs and empower him to complete his studies in institutions of education and continue in the process of self-learning, the thing that works to build the students personality, the thinker student, the explainer, and employer of knowledge.

So, curriculums and school books bear a significant share of the responsibility of preparing the

student for a life that empowers him of escorting the accelerating changes in all sides of life (Abu Zeinah, 2010: 23), in addition to offering the opportunity to the students to acquire cognitive skills, share in behaviorally, cognitively, and sentimentally developing them and providing them with a weapon enables them to produce knowledge and not consume it in the shadow of the economy of the market (Al- Hashemi and Al- Izzawi, 2007). In addition, to review the building curriculums of mathematics, developing and evaluating them from time to time is a national necessity because of the qualitative step which the world witnesses. Mathematics is a worldly language that invades all branches of other sciences and is considered from its basic constituents and exceeds that it is an essential requirement to meet the needs of the individual in recognizing time and place.

So, developing the school book is considered the essential teaching source and an essential tool of teaching and learning tools. It represents the most significant sum of the authorized educational curriculum and saves the highest level of the directed educational experiences toward attaining the hoped educational objectives. The school book is scrutinized as the core and essence of education because it specifies information to be studied by the learner and remains the process of teaching going on; it is a means by which the student is taught and acquires reading skills writing. Also, it is the single and essential reference for the student upon which he depends in deliberation and enriching his mathematical information at exams described a printed record and not an audible saying. The school book is also considered the most accessible educational source for the studier in his public and private environment (Abu Zeinah, 2010:25).

In the year (2000), the National Council for Teachers of Mathematics issued the document of "standards Curriculum and Evaluation for school mathematics", and these standards laid the broad – lines at the national level for each of the essence of the content and the intellectual operations and skills. They had formed the basis for directing the process of developing the education curriculums (National Council of Teachers of Mathematics (NCTM, 2000:5). This was the first effort from a specialized educational organization in mathematics. This document had reflected in principle, the visions, approaches, and imaginations of the concerned people with school mathematics from teachers, supervisors, and educational researchers, and directions of development in education to achieve a high mathematical ability, represented in reinforcing the employment of thinking and justification strategies, and effective mathematical communication, and concentration on relations and mathematical ties. And imitation of mathematical operations is a basic and essential constituent in mathematics; they tie mathematics with the life stands. They are considered the most prominent features of human civilization. What that requires movement in the depth of mathematics to employ it in life tasks, in response to the call of the worldly development movement, reflects the community's need in the age of knowledge economy and information technology. So, the change has to be covering the cognitive mathematical content and its operations, and the class standards support such procedures and each teacher and the student role (NCTM, 2000:17-18). So, these standards describe a group of comprehensive objectives essential to teach mathematics and the basic skills needed by the student to be an influential human and effective through achieving ties between school mathematics and life mathematics to make correct and daily decisions. And the standards asserted.

The significance of the mental skills and the concentration on solving the matter, the critical thinking, developing the sense of innovation, and employing logic and rationality in ligation of things (Common Core Standards Initiative, 2010:72). Adoption of specialized worldly standards to judge the development emerged on curriculums of mathematics in general, and on parts of it in particular, they surly reflects the message contained in these standards to achieve equilibrium between the conceptual understanding and procedural understanding of them (Elmore, 2004)

The Ministry of Education in Jordan had carried out many projects for educational development the last of them were in both years (2019, 2020) by laying an ambitious plan to build curriculums and new books covering all studying stages, designed to prepare students for life and possess the required skills of work (kindergartens stage, the basic stage, and the second stage).

The mathematical operations represent a basic constituent and significant in mathematics, for they connect mathematics with the life stands because they provide learners with the necessary basic

skills for the practical life, such as skills of place sensation, exploration and ability to solve problems, deductive, explanation and ability to conjecture, and develop the logical thinking, that is considered one of the most prominent features of the human civilization.

Starting from the significance of the school book as considered an occupational translation of the curriculum and one of the primaries means upon which the student, the teacher, and the supervisor depend in the operation of teaching and learning, the need to uncover the extent of concordance of the content and processes of modern mathematics books in Jordan with standards of the National Council for Teachers of Mathematics (NCTM, 2008).

Depending on what preceded, this study came to analyze mathematical operations standards in mathematics books for classes from the first grade until the basic fourth grade and because these grades are a basic stage in education. Hence, it is necessary to search in the books' content aiming at educating and developing them and recognize the extent of their agreement with the international standards for mathematics, for the information acquired by the student in this stage remains stable in his memory and is considered the basis upon which his cognitive growth is subsequently built.

### 1.1 The problem of the study

The process of revising curriculums and what emerges from it of studying texts is considered a constant and permanent process, and curriculums of mathematics have witnessed a series of change attempts on the purpose of modernizing and development in the majority of schools in the world states aiming at following the cognitive effects in all subjects of mathematical knowledge from aside, and methods of teaching them from the other (Al-Hanaki, 2008).

The fifth international study for mathematics and science (TIMSS,2015) indicated that many states suffer from performance weakness of their students in mathematics and lowness of obtaining performance level of Jordan students of mathematics in general mathematical operations in particular. This thing made the need urgent to investigate standards of mathematical operations for the first four grades by principles and standards of worldly mathematics (NCTM, 2008). Therefore, the educational system in Jordan witnessed a meditative stand for the comprehensive stand education outlets, raising their quality level and care about the mathematical operation. The Jordan Ministry of Education manages the building and carrying out the curriculums beginning with laying the curriculum document for all grades, then choosing authors and members of the committee of direction and supervision from experts and university professors. There will be a role for the central administration in the Ministry of Education in carrying out the curriculum through the supervisors training on the machinery of executing the curriculum and evaluating it from the field directly, for the sake of taking along provision with the feedback to modify the curriculum and developing it (Ministry of Education, 2008).

It appears from what preceded a non- harmony between outlets of the educational system and what the Ministry of Education aspires to in Jordan, and it is achieving the concept of the qualitative suitability, through which academic outlets with qualitative specifications, from part of knowledge, mathematical operations and contemporary skills, that became on urgent necessity for any student. From here emerges the problem of study.

### 1.2 The Questions of the Study

The study had attempted to answer the following primary question:

What is the extent of school mathematics standards issued from the National Council for Teachers of Mathematics (NCTM) concerning the mathematical operations in mathematics books for the primary stage: starting from grade one to grade four in Jordan?

Five subsidiary questions emerged from it:

1. What is the extent of school mathematics standards availability issued by the National Council for Teachers of Mathematics (NCTM) concerning mathematical problem-solving in mathematics books for the primary stage, from the first grade in Jordan?

2. What is the extent of school mathematics standards availability issued from the National Council for Teachers of Mathematics (NCTM) concerning mathematical thinking in mathematics books for the primary stage from grade one to grade four in Jordan?
3. What is the extent of school mathematics standards availability issued from the National Council for Teachers of Mathematics (NCTM) concerning the mathematical communication in mathematics books for the primary stage from grade one to grade four in Jordan?
4. What is the extent of school mathematics standards availability issued from the National Council for Teachers of Mathematics (NCTM) concerning mathematical representation in mathematics books for the primary stage from grade one to grade four in Jordan?
5. What is the extent of school mathematics standards availability issued from the National Council for Teachers of Mathematics (NCTM) concerning the mathematical ties in mathematics books for the primary stage from grade one to grade four in Jordan?

### 1.3 Significance of Study

This study acquires its significance from the significance occupied by the school book, and importance of mathematics itself, which has a distinguished position among domains of other cognitions being a fertile field for training students on patterns of thinking and the mathematical operations that can be employed in the practical life of the student, and precisely significance of study has an axe to uncover the practical reality for the included operations in books of mathematics for the first- four grades; it is a remedial diagnostic operation leads to develop standards of the included mathematical operations in this part of the mathematical content for the first- four primary grades; and it is the primary stage of education and forms the basic upon which the student's mathematical cognitive growth is built and his practical skill subsequently, the thing that produces improvement leads to developing the level of school book, teaching operations, and the mathematics curriculum, through uncovering points of weakness to work on removing them, and points of strength to reinforce them.

### 1.4 Terminology of study

1. Analysis of the content:" it is the technique that aims at describing the educational content objectively and methodically lead to specify the essential elements for learning (Abu Zeina,2010).
2. The lowest primary stage is primary learning in Jordan, and it extends from grades (1-4) in this study.
3. Standards: " they are opinions obtaining of the psychological, social, scientific and educational dimensions, applying them, and recognizing the accurate picture of the subject wanted to evaluate or deduce judgments on the thing we are performing (Al- Lagani & Al- Jamel, 2003).

And they can procedurally have defined in this study as a group of conditions or specifications that both researchers will build them depending on standards (NCTM,2000), and they appear on the form of a list, in light of it the analysis of the content of the mathematical operation included in books of mathematics for grades of the lowest primary stage in Jordan.

1. Standards of operations: they are acquiring methods and employing knowledge of the mathematical content, and they cover: solving the problem, mathematical thinking, proof, communication, the mathematical ties, and representation, provided in the document of standards (NCTM,2000).

### 1.5 The Limits of the Study

1. This study is confined to mathematics books from grade one to grade four in Jordan for the studying year (2019-2020).

2. Analysis operation is confined to the mathematical operations (solving problem, the mathematical thinking, the proof, the mathematical communication, the mathematical ties, and mathematical representation), for the book of mathematics for grades from (1-4) in Jordan.

## 2. Previous Studies

Al-Sir's study (2017) showed the effectiveness of the proposed program in developing skills of analyzing mathematics content, and the size of impact was great; meanwhile, the program conserved the height of trend level toward mathematics (Al-Sir, 2017). Meanwhile, Chang and Silalahu's study (2017) gathered and surveyed several studies related to analyzing mathematics books to save an abstract and general review of the available information, and (44) published papers had been chosen from 1953 to 2015 based on specified standards. The result showed that the most axes depended on analyzing books are: standards of the content and the most common subject was numeration and operations and distributive characteristic (15 studies), and the most significant number of studies related to analyzing books was (18), they are from books of mathematics for the elementary school (Chang & Silalahu, 2017).

And in a study by Bader (2016), results of analyzing the content of the book of mathematics for grade four showed non-availability of correspondent requirements for the international trends for mathematics and sciences (TIMSS) (Bader, 2016).

But Morgen et al. study (2015) tackled analyzing the complete books of mathematics in the united states of America and investigating what if results of this analysis were paralleled with (SEC) analysis, and do results of analysis differ if content procedures of content analysis facilitation had been done. The results indicated that analyzing each fifth element only is from the content produces correspondence with (SEC) analysis, and that doesn't affect the faithfulness of analyzing the content. (Morgen et al., 2015). But Abed's study (2020) deduced that axes of data analysis standard and potentials in accordance with standards of mathematics (NCTM) included in books of mathematics for grades (4-6) came weak (Abed, 2020).

O'layat and Al-Dweiri's study (2015) deduced that the extent of concordance between the content of both books, the seventh and the eighth, with standards of (NCTM, 2000) was differentiated (O'layat & Al-Dweiri study, 2015).

While Al-Zu'biy and Obeidat (2014) study the results of the analysis showed that the content of the Fourth Grade Book is according to standards of operations issued from NCTM (2000), include the following rates: aspects of number and operations (%12.30-%14.57), aspects of Geometry (%6.42-13.58), aspects of data analysis and potentials (%6.98-%15.12), aspects of problems- solving (%9.41-%28.24), aspects of logical thinking and proof (%5.17-%15.52) and aspects of communication (%4.30-%25.81) (Al-Zu'biy & Al-Obeidat, 2014).

Mugat (2011) did a study, results of the analysis showed a lack of Palestinian Books of Mathematics for Grades Fourth, Fifth, and Sixth by standards issued from NCTM (2000), from these standards: standards of measurement, the standard of data analysis, the standard of problems solving, the standard of justification and proof, the standard of correlation, the standard of communication, and the standard of imitation (Mugat, 2011). Also, Al-Sharari (2009) study deduced that lack of Geometry Standard for the first three grades in Books of Mathematics in the Kingdom of Saudi Arabia in accordance with standards issued from (NCTM, 2000; Al-Sharari, 2009).

Sbaih (2004) study tackled analyzing Books of Mathematics for grades from the Sixth to the Tenth in Jordan, in accordance with the standards issued from NCTM, 2000) for results showed that rates of agreement of content standards (standard of Geometry and measurement), standards of operations (standard of problem-solving, standard of mathematical correlation & standard of mathematical analysis) were weak & few according to standards of (NCTM, 2000) (Sbaih, 2004).

And through revising the previous studies, there was no car about analyzing the mathematical operations in the content of books, and due to the researchers' knowledge, there is only one study

that tackled the analysis of the content of the mathematical operation of grade four in Saudi Arabia, it is (Al-Zu'biy & Al- Obeidat, 2014) study. Nevertheless, both researchers benefited from the previous studies in designing the study, specifying the theoretical framework defining terminology of study, specifying the procedures, building the means of analysis, discussing results, and enriching the present research on many sides. This study is characterized by the few studies in the limits of both researchers' knowledge that tackled analyzing the mathematical operations in mathematics books for grades 7<sup>th</sup>, 5<sup>th</sup>, and 4<sup>th</sup> in Jordan.

### 3. Methods and Procedures

Here there is a description of the research methodology, specifying the community of study and its sample, the how of preparing and developing the instrument of study, and how to assert the faithfulness of this instrument, its reliability and procedures of it carrying it out, for the sake of achieving objectives of the study.

#### 3.1 The Sample of Study

The sample of the study consisted of all school books of mathematics) confirmed for students in grades 7<sup>th</sup>, 5<sup>th</sup>, and 4<sup>th</sup> in Jordan in the studying year (2020-2021).

#### 3.2 Methodology of the study

This study employs the descriptive methodology, and that is through following the technique of analyzing the content. And it is the group of the methodological steps that seek to discover the concealing meanings in the content. The connective relations with these meanings, through the quantitative objective research and the organizer of the apparent traits in the content (Abdel Hameed, 2000:220), for the employment of this methodology in this study assists in describing the content of the mathematical operations included in books of mathematics for grades of the lowest primary stage to recognize the extent of their concordant with the universal standards that the National Council had laid for teachers of mathematics in the united states of America (NCTM, 2000). A list of standards with operations should be available in the content of operations for mathematics books for the primary stage for grades (1-4), and the list had covered (18) standards, divided into five axes. The analysis of operations of the content had been done according to Lekart's fivefold scale, and Table (1) clears these standards.

**Table 1:** List of content analysis according to Lekart's fivefold system

V. Great degree	Great degree	Med degree	Little degree	Extremely Little degree	Standard
87.5-100	62.5-87.25	37.5-62.25	12.5-37.25	0-12.25	Pre. rate

### 4. Validity and Reliability of Analysis

Units in books of the essential primary stage had been done (1-4) grades, in light of the assistance by a group of mathematics students in the fourth year, five of these students had been trained, of those who showed their wish in this project; on the how of analysis procedures of the content of the operation included in mathematics books for grades from (1-4). Each analyzer alone had done the operation to one of the mathematics book units, and (Banker et al., 1984) agreement coefficient had been counted between one of the two researchers and the five analyzers. Table (2) clears that.

**Table 2:** Agreement coefficient between one of the two researchers and the five analyzers in standards of the content of the mathematical operation

Fifth	Fourth	Third	Second	First	Analyzer
.083	0.87	0.84	0.86	.089	Researcher

#### 4.1 Procedures of Study

Both researchers performed the following procedures to achieve the objectives of the study

- Informing the theoretical literature and related studies with the National Council for Teachers of Mathematics (NCTM, 2000) concerning the mathematical operations for grades of the basic stage (1-4).
- Developing instrument of study by depending on standards of the content of the mathematical operation provided in standards of NCTM (2000) agrees with study objectives.

Showing the study instrument to a group of arbitrators of those with specialization and experience to scrutinize the faithfulness of instrument, validity, and reliability faithfulness had been asserted.

- Doing operations of analysis to units of each book of mathematics books for grades (1-4).
- Emptying analysis results, statistically processing them using suitable methods, and discussing and explaining the results.

#### 4.2 Statistical Processing

Achieving objectives of the study, the repetitions, and the percentage rates were employed for each standard of the subsidiary standards for each operation of the mathematical operations, and each grade of the study grades, and the general average for each grade, and the average for each branch of the subsidiary standards for each operation.

### 5. Results of the Study and Their Discussion

#### 5.1 Firstly: the results of the first question and its discussion

To answer the question of the study: percentage rates included in books of mathematics had been found from grades 4<sup>th</sup>, 5<sup>th</sup>, and 7<sup>th</sup> for the operation of solving the mathematical problems. The following Table clears that.

**Table 3:** Percentage rates included in mathematics books from grades (1-4) for solving mathematical problems

Subsidiary Standards problems solving	Total 7	Total 5	Total 4	Sum	Average
Building mathematical knowledge through problem-solving	100%	100%	100%	300%	100%
problem-solving that appear in mathematical context & other contexts	0.21	0.19	0.13	0.81	0.27
Applying and adapting numerous suitable strategies for problems solving	0.12	0.24	0.12	0.48	0.16
Controlling and practical scrutinizing for problems solving and meditating them a general average	0.2	0.16	0.05	0.41	0.14
Sum of 2nd,3rd and fourth Standards	0.37	0.33	0.30	.35	.11

Table (3) shows that results of the general average of subsidiary problems solving standards for grades 4<sup>th</sup>, 5<sup>th</sup>, and 7<sup>th</sup> came between (37%-30%) with grade 7<sup>th</sup> is the most and grade 4<sup>th</sup> is the least. While the standard "Building mathematical knowledge through problem-solving" appears to be used



entirely for all the grades. Table (3) also shows that the problem-solving standards appear the least percentage for grade 4<sup>th</sup>. For example, Table (3) reveals that the results of both grades 7<sup>th</sup> and 5<sup>th</sup> had an average of 37%,33%, respectively, while the development in grade 4<sup>th</sup> is 30%.

And this result agrees with what (Al-Zu'biy & Al- Obeidat, 2014) study showed that the standard of solving problems in the book of grade four in the kingdom of Saudi Arabia didn't overstep the rate of %29, also what the (Mugat 2011) study provided that rates of operations in the Palestinian books for the first three grades are low. Also, the (Bader, 2016) study showed non-agreement of grade four with requirements of the international trends for the examinations (TIMSS, 2015). and what studies by (Abed, 2020; O'layat & Al-Dweiri,2015; Al- Sharari, 2009; Sbaih, 2004) agreed upon. It is also noticed that standards of the content in books if the elementary stage came weak compared to universal standards. And this contradicts with the standard of solving problems included in standards of universal school mathematics that development in education requires probing in the depth of mathematics, employing it in life tasks; and that will never be except if change covered the mathematical operations headed by solving the mathematical operations to achieve high mathematical ability (NCTM, 2000:17-18).

It has to be asserted that the suitable curriculums for this age should be concentrated on the significance of mental skills and concentration are solving the matter and acritical thinking, developing the soul of innovation, and employing logic and mentality in litigation of things (Common Core Standards Initiative, 2010:72). We assert in this context that this operation between mathematics and the reality of life is considered a separation from the natural context that emerged from it and for it (Abdel-Fattah, 2005). So, the mathematical experiences are considered one of the essential groups of experiences in the child's life, and its significance comes from being the entrance to solve the daily problems and the only instrument that organizes its thoughts and arranges them (Al- Sabbagh, 2005).

## 5.2 *Secondly: results of the second question and its discussion*

To answer the second question of study, the percentage rates included in books of mathematics had been found from grades 4<sup>th</sup>,5<sup>th</sup>, and 7<sup>th</sup> for the operation of solving the mathematical thinking and the proof. The following Table clears that.

**Table 4:** Percentage rates included in mathematics books from grades (1- 4) for the operation of the mathematical thinking and the proof

<b>mathematical thinking and proof / Subsidiary standards</b>	<b>Total 7</b>	<b>Total 5</b>	<b>Total 4</b>	<b>Sum</b>	<b>Average</b>
Recognizing the logical thinking & proof	0.24	0.10	0.36	0.70	0.23
Building the mathematical conjectures and testing them	0.19	0.08	0	0.27	0.09
Developing and evaluating the mathematical persuasiveness's and proofs	0	0.01	0	0.01	0.00
Choosing and employing different patterns of logical thinking and techniques of proving	0	0.00	0	0.00	0
General average	.11	.04	0.09	.24	.08

It is clear from Table (4) that the results of availability of the logical thinking and proof standards in the content of the grades 7<sup>th</sup>, 5<sup>th</sup>, and 4<sup>th</sup> books were low; for the general average of this standard range between (11%-4%); where grade 5<sup>th</sup> was the lowest rate. The standard "Developing and evaluating the mathematical persuasiveness's and proofs" and the standard "Choosing and employing different patterns of logical thinking and techniques of proving" for mathematical thinking are both 0%, and it is meant by the proof in this stage the informal proof through the perceptual things and examples, drawing, and numeration. This result agrees with what (Al-Zu'biy & Al- Obeidat, 2014)



study showed that the thinking standard in grade four books in Saudi Arabia did never overstep the rate %16 (Bader, 2016) study provided. This result contradicts with the universal standards entrusted thinking special importance, where penetrated all criteria of the school curriculum and all its operations in all stages, so it became expectable for the elementary stage student to learn the proof through justifying and explanation of what he thought to attain the solution and the significance of that as the significance of solution. So, thinking in mathematics is correspondent to providing the student with instruments that he needs to effectively deal with any information or variables that come in the future. Therefore, it is excepted that the student graduate from school bearing a provision of thinking skills through years of study make mathematics meaningful, and make him able to produce a deductive logical-mathematical persuasiveness starting from the imposition. The assess and evaluate values such these persuasiveness's; for the laid curriculums and in general view the pupil in the primary stage from the (first grade to the fourth one) as he didn't reach the level of perception and awareness to test mathematical conjectures, and employs different patterns of thinking and develops persuasiveness's and evaluate them. However, it must indicate the necessity of interest in this with more thinking standards, favoring them and enlisting them in this content by classical non-methods that concord with the student's age (NCTM,2000:58).

### 5.3 Thirdly: results of the third question and discussing it

To answer the third question, the percentage rates included in mathematics books from grades 4<sup>th</sup>, 5<sup>th</sup>, and 7<sup>th</sup> for the operation of relations and mathematical ties. The following Table clears that:

**Table 5:** Percentage rates included in books of mathematics from grade 4<sup>th</sup>, 5<sup>th</sup>, and 7<sup>th</sup> for the operation of mathematical relations and ties

Mathematical relations & ties / subsidiary standard	Total 7	Total 5	Total 4	Sum	Average
Recognizing the relations among the mathematical thoughts & employing them	0.24	0.21	0.28	0.73	.24
understanding the how of mathematical contribute every logic correlation idea correlation & depending each Atheros	0.15	0.24	0.29	0.68	0.23
Recognizing mathematics & employment in contexts outside mathematics frame	0.25	0.21	0.18	0.64	0.21
General Average	0.20	0.22	0.25	.49	.32

Results of the operation of relations and mathematical ties in Table (5) show that the general average for the extent of availability of this standard is %32; the thing that means the standard of relations operation and mathematical ties in the content of the three books is available at a few degrees for grades the 7<sup>th</sup>, 5<sup>th</sup> and 4<sup>th</sup>. This agrees with the nature of the Jordanian curriculum for these grades, so in the content of these grades, books begin with putting forward the problems in non-mathematical contexts for what the content contains mathematical subjects like analogy and geometry. Thus, in both grades of the 7<sup>th</sup> and 5<sup>th</sup> perception and awareness of the student increases and he has a mathematical stored satisfactorily to notice relations among mathematical ideas, their correlations and dependence on each other, different from both grades: the first and the second that constitute the student's experience and his mathematical storage at the beginning of their constitution. But, on the other hand, the results also showed weakness conspicuous with standards of the mathematical relations and correlations for the four grades. This result agrees with what (Mugat, 2011) study showed that the rates of operations in the Palestinian books for the first three grades are low, and also agrees with what numerous studies showed that standards of operations for the books from the sixth to tenth grades were non and few (Sbaih, 2004). Thus, the content of mathematics books for the first three grades and grades of the primary stage don't reach the lowest limit required and agrees

with the universal standards (Al-Sharari,2009). The result of this study contradicts with what the universal standards included and cleared that performed the relations and mathematical correlations among the mathematical ideas, support and reinforce the understanding cognitively processing stored in the memory and retrieved at the student's need, in addition to this the standard asserts on the unit of mathematics. It is a correlated integrated all, and employing this standard requires the student to bear the responsibility of his learning through connecting the concepts and the mathematical ideas with what he has of previous learning (NCTM,2000:64).

5.4 *Fourthly: results of the fourth question and discussing it*

To answer the fourth question of the study, the percentage rates included in books of mathematics had been found from grades 7<sup>th</sup>,5<sup>th</sup>, and 4<sup>th</sup> for the operation of representation and modeling, and the following Table clears that:

**Table 6:** Percentage rates included in mathematics books from grades (1-4) for the operation of representation and modeling

Representation and modeling/subsidiary standards	Total 7	Total 5	Total 4	Sum	Average
Building & employing representation of mathematical ideas to organize registering & communication	0.26	0.12	0.31	.69	0.23
Testing & applying translation in between the mathematical Representation for solving problems	0.34	0.07	0.13	0.54	0.18
Employing representation to model and social mathematical explain the natural phenomena	0.26	0.33	0.06	0.65	0.22
General average	.27	.17	.27	.62	.21

It is clear from Table (6) that the general average for the extent of availability of the modeling and representation standard is %21, and the highest rate for the standard of representation and modeling was attained by the 7<sup>th</sup> and 4<sup>th</sup>, and 17% for the 5<sup>th</sup> grade. The modeling and representation standard in books for the three grades includes numbers and operations, and its representations by using pictures promote modeling and representation for the 4<sup>th</sup> grade and applying symbols, tables of lodgings, and tables increasingly; this agrees with the results of the international examinations that showed the weakness of students of the fourth grade by mathematical representations (TIMSS, 2015). And results of this study agreed with what many studies showed that standards of operations for books from the sixth to the tenth grade were non and few (Sbaih, 2004). The content of mathematics books for the first three grades and grades of the primary stage doesn't reach the lowest required limit, which agrees with the universal standards, that showed that methods of representing the mathematical ideas are essential to support understanding these ideas and transference of those ideas effect for the practical life. So, providing the student with the multi- representations of the one mathematical idea forms instruments with a meaning enlarges the pliability of the student for the mathematical thinking (NCTM, 2000:67). The thing that obliges planners of the curriculums to correct this situation.

5.5 *Fifthly: results of the fifth question and its discussion*

To answer the fifth question of study, the percentage rates included in books of mathematics had been found from grades 4<sup>th</sup>, 5<sup>th</sup>, and 7<sup>th</sup> for the operation of mathematical communication. And the following Table clears that.

**Table 7:** Percentage rates included in books of mathematics from grades 4<sup>th</sup>, 5<sup>th</sup>, and 7<sup>th</sup> grades for the operation of the mathematical communication

Mathematical communication /subsidiary standards	Total 7	Total 5	Total 4	Sum	Average
Organizing & reinforcing their thinking through communication	0.13	0.09	0.07	0.27	0.09
Transferring their mathematical thinking by logical correlation to colleagues' teachers & others	0.21	0.01	0.21	0.43	0.17
Analyzing & evaluating mathematical thinking for others & their strategies	0.15	0.12	0	0.27	0.09
Employing mathematical language to express mathematical ideas accurately	0.13	0.12	0	0.25	0.8
General average	.16	.09	.07		.12

Results of Table (7) showed that the general average for the extent of the fifth axis's availability amounted to (%12); the thing that means the degree of standards of communication available in the content of 7<sup>th</sup>, 5<sup>th</sup>, and 4<sup>th</sup> books, range between (7%-16%), this means lack of the content for these standards despite their significance at this stage. There were fewer degrees than the availability for both standards " analyzing and evaluating the mathematical thinking of others and their strategies"; " Organizing & reinforcing their thinking through communication ", with an average of (%9). That may refer to planners' belief in the difficulty of applying this standard for the four grades, for the perception and mathematical awareness of the student aren't completed with what satisfies for evaluating and analyzing others' thinking, and the rate of other standards was few, and that may refer to the content concentration on obtaining knowledge more than reinforcing the other mathematical communication skills. The results of this study agreed with what (Al-Zu'biy and Al- Obeidat, 2014) study that the standard of communication in the book of grade four in the kingdom of Saudi Arabia did never overstep the rate of %25, and also what (Mugat, 2011) study provided that rates of operations in the Palestinian books for the first three grades were low. Also, what (Bader, 2016) study showed of non-concordance of the fourth-grade book with requirements of the international examinations, and what each of (Abed, 2020; O'layat Al-Dweiri, 2015; Al-sharari,2009; Sbaih, 2004) with standards of the content in books of the elementary stage came weak compared with the worldly standards.

And this result contradicted with the worldly standards that proposed granting pupils the opportunity for training on communicating what they think of for others to assist them in constituting correlations among their mutative thinking, the proof, and the logical thinking, and the goal should be the searching for a mutual ground between the student's experience and the logical principles he attempts to deduce. So, communication in mathematics is the method through which the student can participate his ideas with others and illustrate understanding and informing the significant points of view, and this leads to challenging the student's abilities to listen to others and choose the appropriate language to convince others with justifications, persuasiveness's, and the mathematical ideas (NCTM, 2000:60).

And results showed lowness level of obtainment instrument of students of Jordan in mathematics in general and the mathematical operations in particular, the thing that made the need urgent to investigate standards of the mathematical operations for the first four grades leaning on principles and the universal means of mathematics (TIMSS, 2015).

It had to be indicated here to observe the standards of communication more at planning the curriculum, its significance in polishing students' skills and developing their critical thinking through contact with others and evaluating their ideas.

## 6. Conclusion

This review offers three contributions. First, we summarized the selected past research articles to analyze mathematics content books, and through revising the previous studies, there was no car about analyzing the mathematical operations in the content of books. Due to the researchers' knowledge, there is only one study that tackled the analysis of the content of the mathematical operation of grade four in Saudi Arabia, it is (Al-Zu'biy & Al- Obeidat, 2014) study. Nevertheless, the researcher benefited from the previous studies in designing the study, specifying the theoretical framework defining terminology of study, specifying the procedures, building the means of analysis, discussing results, and enriching the present research on many sides. This study is characterized by the few studies in the limits of both researchers' knowledge that tackled analyzing the mathematical operations in mathematics books for grades 7th, 5th, and 4th in Jordan.

The second contribution of this study was its focus on the process of revising curriculums and what emerges from it of studying texts is considered a constant and permanent process, and curriculums of mathematics had witnessed a series of change attempts on the purpose of modernizing and development in the majority of schools in the world states aiming at following the cognitive effects in all subjects of mathematical knowledge .

The fifth international study for mathematics and science (TIMSS,2015) indicated that many states suffer from performance weakness of their students in mathematics and lowness of obtaining performance level of Jordan students of mathematics in general mathematical operations in particular. Therefore, the educational system in Jordan witnessed a meditative stand for the comprehensive stand education outlets, raising their quality level and care about the mathematical operation. The Jordan Ministry of Education manages the building and carrying out the curriculums beginning with laying the curriculum document for all grades, then choosing authors and members of the committee of direction and supervision from experts and university professors. There will be a role for the central administration in the Ministry of Education in carrying out the curriculum through the supervisors training on the machinery of executing the curriculum and evaluating it from the field directly, for the sake of taking along provision with the feedback to modify the curriculum and developing it (Ministry of Education, 2008) .

It appears from what preceded a non- harmony between outlets of the educational system and what the Ministry of Education aspires to in Jordan, and it is achieving the concept of the qualitative suitability, through which academic outlets with qualitative specifications, from part of knowledge, mathematical operations, and contemporary skills, that became on urgent necessity for any student. The problem of study emerges that will answer the following main questions: What is the extent of school mathematics standards issued from the National Council for Teachers of Mathematics (NCTM) concerning the mathematical operations in mathematics books for the grades 4th, 5th, and 7th in Jordan?

The third contribution of this study was its focus on the results of the analysis, which showed lowness level of obtainment instrument of students of Jordan in mathematics in general and the mathematical operations in particular, the thing that made the need urgent to investigate standards of the mathematical operations for the first four grades leaning on principles and the universal means of mathematics (TIMSS, 2015) .

It is expected that further research can be conducted in different fields and that deeper analyses can continue to explore the correlations between various perspectives on learning and school levels (primary level, senior high school level, and university level). In the following years, we expect that there will be much research regarding the analysis of mathematics textbooks that will help teachers, educators, and even the government better develop students' mathematics textbooks so that they are more efficient, convenient, and valuable

## 7. Recommendations

In light of the research results, it can formulate the following recommendations:

- Increase of concern about the availability of operations standards in the first four grades books, significantly solving the mathematical problems and building the new knowledge.
- Deepening the thinking and the mathematical communication of students of the elementary stage and enlisting it agrees with the student's age.
- The necessity of increasing connection of educational activities with the representations in the elementary stage; for the student, this stage deals with things around him by his senses.
- Get benefit from the list of standards deduced by the present study in developing mathematics books for grades (the first to the fourth).
- Do analytical, evaluative studies for the mathematical operations for grades from fifth to twelfth.
- Conduct comparative studies with the universal curriculums for the mathematical operations to recognize the strengths and weaknesses in the current curriculum.

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