An analysis of third intermediate grade mathematics course book in the light of CFBT standards

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Abstract:
The current research aimed to identify the availability of British (CFBT) standards in the mathematics course book for the third intermediate grade by analyzing its content, the research community consisted of the mathematics book in its first and second parts scheduled for third-grade intermediate students for the academic year 2020-2021. As for the research sample, it is the research community, while the research tool consisted of two parts, the first for content standards, and the second for process standards according to the list of standards. The validity of the tool was confirmed by presenting it to experts and referees. As for the reliability of the analysis,
It has been calculated by two methods: reliability across others and reliability through time, where it appeared in a high percentage, the researcher relied on it on frequencies and percentages as statistical means in this research, the results showed the following:
By analyzing the content of the mathematics book for the third intermediate grade In light of the standards (CFBT), which consists of two parts, the first section:
content standards consists of three fields of arithmetic and algebra in the first rank with a percentage of (60%), and engineering and measurement in the second rank with a percentage of (29%), and data processing in the last rank by (11%), As for the second section, Operations Standards, it consists of one fields, which is reasoning and solving problems, and it came at a percentage of (13%).
In light of the research results, a set of recommendations and proposals have been written, including: Benefiting from the list of CFBT standards in developing a mathematics textbook for the third intermediate grade, and seeking to prepare national standards for curricula in Iraq in general and mathematics curricula in particular.

Keywords: content analysis, mathematics textbook, CFBT standards.

Introduction:

The advancement and development of a country is estimated by the extent to which its members acquire scientific skills and knowledge. We find that the interest of many countries has shifted towards reviewing their educational curricula and seeking to develop them. The textbook is the most important component of the curriculum and it is an important source of education, including the standards it contains, and analysis is one of the most important methods of educational evaluation. Especially when judging the content of any subject and achieving its objectives or the content of any academic curriculum to judge the quality extent of the quality of this curriculum, and the extent of its comprehensiveness, its integration vertically at the level of educational stages and horizontally at the level of other curricula of the same grade , the extent of its adequacy to achieve the objectives entrusted to it other standards ,

This method is often used in the analysis of textbooks to judge the quality of the books, starting from production and printing, passing through the style, and ending with the adequacy and accuracy of the scientific content of those books (Shehata and Zainab Al-Najjar, 2003: 93)

Chapter 1

Identification of the research

Research problem:

The textbook occupies a fundamental and important position in the educational process, as it represents the translation of curricula in reality, and many consider it an alternative to it. The textbook is the main reference, and perhaps the only one for the student and teacher in the traditional educational systems prevalent in most countries of the region (Al-Shehri, 2010: 17), where the content of the textbook

represents a fundamental pillar of the curriculum, as it includes the goals envisaged from it, the activities that are used in teaching it, methods of assessment, evaluation, follow-up and feedback, and it can be indicated that the content represents that part of the knowledge that was chosen to help achieve specific educational goals (Mari and Al-Haila, 2009: 41), based on the national and international interest in studying the standards for mathematics in general and on the basis of the importance of the textbook and its role in the educational process, this study came to shed light on the British standards (CFBT) as standards for mathematics, representing a set of criteria and statements in the light of determining what the student can understand and learn it, and to determine the degree that includes the content of the mathematics curriculum for third-grade intermediate students on these standards

Where the problem of the study is to answer the following main question –

What are the British standards (CFBT) which included in the content of the mathematics book scheduled for third-grade intermediate students in the academic year 2020-2021?

Research significant:

The significant of research can be summarized as follows:

- **The theoretical significant of the research**:

1- The importance of the third intermediate grade within the intermediate stage as it represents a transitional stage for middle school in which the student is constructed and prepared in a peaceful scientific manner so that he can continue his scientific path for the future.

2- The importance obtained from analyzing the mathematics book for the third intermediate grade according to British standards (CFBT) for teachers, educational supervisors and workers in the field of specialization.

3- The extent of the availability of British standards in the content of the mathematics book for the third intermediate grade and verifying that the content matches them.

4- The importance of British Institution standards (CFBT) as an educational institution **outside** the British Ministry of Education and Science seeks to provide educational aid in the United Kingdom and around the world.

5- This study provides a list of British standards for the subjects of the mathematics book for the third intermediate grade that may benefit from them to develop curricula in the Ministry of Education and its workers

- **The applied importance of research**:

1- The importance of being guided by international standards in the field of mathematics, especially what is widely and largely accepted internationally as CFBT standards.

2- Providing a knowledge vision for the workers in developing curricula for intermediate third grade mathematics and providing it with international standards and taking it into account when writing textbooks in the future

3- This study can benefit other researchers to study the extent to which the British CFBT standards are included in the mathematics curriculum in other grades or educational stages **.**

Objective of the research:

The current research aims to identify the availability of British standards(CFBT) in the mathematics course book for the third intermediate grade, by analyzing its content, and by answering the following question: -

What is the percentage of availability of (CFBT) standards that included in the mathematics textbook for the third intermediate grade?

Research limits:

The research was limited to the mathematics textbook for the third intermediate grade in Iraq, in its first and second parts, for the 2020-2021 academic year, issued by the Ministry of Education / General Directorate of Curricula.

Defining terminology.

1- Content Analysis:

It was defined by (Al-Aboudi, 2012) as" one of the descriptive survey research methods used by the researcher to describe the content as it shows a quantitative and objective description in its usage In judging whether there is a phenomenon or an element or not, in order to recommend its development in light of specific criteria" (Al-Aboudi, 2012: 12).

The researcher defines it operationally as follows

"It is the method adopted by the researcher with the aim of ensuring the degree of inclusion of the British CFBT standards in the six semesters (relations and inequalities in real numbers, algebraic expressions, equations, coordinate geometry, geometry and measurement, statistics and probabilities) of the content of the mathematics course For intermediate third-grade students in the academic year 2020-2021 AD, certifying an analysis tool that was dsigned for the aforementioned purpose.

2-Mathematics textbook:

It was defined by(Mari and Al-Hailah, 2009) as a broad system that includes the curricular content scheduled for students and contains several elements (content, objectives, educational activities and evaluation), and aims to enable teachers to help learners in a given subject to achieve the desired goals as defined by the curriculum (Mari and Al-Hilah, 2009, 251)

The researcher defines the mathematics textbook for the third intermediate grade from the operational point of view: as "the mathematics book in its two parts (first and second) that was applied by the Iraqi Ministry of Education (General Directorate of Curricula) for the third intermediate grade and for the academic year 2020-2021 AD.

3-(CFBT) standards :

it was defined by Badr, 2015) as a set of criteria, phrases or items in the light of determining what students can realize and learn in mathematics books, and which are written by specialists and experts at an international level that set what should be included in the content of the Mathematics subject , and those criteria are measurable and verifiable (Badr, 2015: 11).

Operationally , the researcher defines it: it is a set of phrases and indicators that determine what the students of the research sample can perceive and learn in the mathematics book scheduled for them in the third grade intermediate for the academic year 2020-2021 AD, which were adopted in the analysis of the content of the course textbook.

Second chapter:

Literature review & previous studies:

1-British Mathematics Standards (CFBT):

The Center for British Teacher (CFBT) has developed content standards for several subjects such as science, mathematics, English language, and others, and the Education Authority in the State of Qatar has adopted these standards in building its curricula (Abdel Moneim 2016: 44), The school mathematics standards are descriptions of what is needed in order to teach students that education that enable these students to learn and do within this content , and it is the cornerstone of developing mathematics education, learning and advancement at all educational levels and in the light of determining the knowledge, understanding and skills that students should acquire (Abu Zina, 2010: 96).

Branches of the (CFBT) Mathematics Standards:

1- Reasoning and solving problems.
2- Arithmetic and algebra in addition to calculus, starting from the tenth grade.
3- Geometry and measurement, which includes trigonometry, starting from the ninth grade.
4- Data processing, which is divided into statistics and probability science. (Supreme Education Council in Qatar - Mathematics Standards, 2004).

2- Content Analysis:

Analysis is a process in which a topic or a unit of study is broken down into its components and components and defining the logical structure of these elements and the relationships between them within the context in which the content was defined, and the analysis is a method aimed at describing the

educational content, a methodological and objective description, which leads to the identification of the basic elements of learning (Al-Hosani, 2011: 350).

- **The importance of analyzing content in the educational field.**

Content analysis helps in :

- Identify the characteristics of textbooks and the components of their content.
- Diagnose the strengths and weaknesses in the content of textbooks with the aim of promote the strengths and address weaknesses (textbook evaluation) (Al-Hashemi and Mohsen Ali, 2014: 175)

Chapter Three:

Research methodology and procedures

First: Research methodology:

The descriptive and analytical approach is used in the current study, which is a set of organized and methodological steps that are used to discover the meanings present in the content, the connections, and the relationships related to these meanings. Through an objective and systematic research of the features appearing in the content (Abdel-Hamid, 2000: 220),

It has been used in this study through the content analysis method, that is the research method used to describe the apparent content in a quantitative, structured ,logical and objectively in light of the analysis unit that is used (Daoud and Abdel-Rahman, 1990: 175).

Second: the research community and its sample:

The research community is the sample of research and it includes the content of the mathematics book in its first and second parts, which will be studied for students of the third intermediate grade for the academic year 2020-2021 AD, and issued by the Ministry of Education, the General Directorate of Curricula.

Third: Search tool: It is an instrument that helps the researcher to collect statistical data about the subject under study in order to analyze it and make decisions regarding it, by using numerical ,digital and mathematical methods in processing data and giving appropriate logical explanations for it (Ammar et al., 2019: 67), In order to achieve the objectives of the study, the researcher built a mathematics book content analysis tool for the third intermediate grade according to (CFBT) standards for content and operations . The following is a presentation of the steps:

1- The researcher relied on the CFBT standards (British Teachers Center Standards), in preparing the analysis tool, for the book topics prescribed for the third intermediate grade mathematics.

2- Writing a list of British standards for content and operations in its initial form and used by the Education Authority of the State of Qatar as standards for mathematics, prepared by the British CFBT Foundation.

3- The list of British Institution Standards (CFBT) referred to in the above paragraph was presented to a group of arbitrators, specialists in mathematics and methods of teaching it to ensure its suitability for the current study and to make appropriate adjustments to it, if any.

4- Preparing the standards' list and the rules in their final form after reading the opinions of experts and specialists.

Fourth: Validity of the tool:

Introduce the list of content and operations standards for the mathematics textbook for the third intermediate grade in a questionnaire to a number of specialized referees and experts in methods of teaching mathematics to verify its validity and suitability for analysis.

The results of the questionnaire revealed the agreement of the arbitrators, after some modifications Which was agreed upon by experts and arbitrators, and also some composite criteria were separated to make them simpler, in order to come out in their final form.

Fifth: Controls of the analysis process

1- The analysis process included all topics of the mathematics book content scheduled for third-grade intermediate students for the 2020-2021 academic year, 2nd ed., With its first and second parts.

2- The analysis process did not include the teacher's guide or any brochures attached to the book or book interfaces, chapters and indexes.

3- The frequency of the paragraph in each indicator is calculated when one paragraph contains more than one indicator.
4- An example that contains multiple branches is considered one paragraph if it is in one indicator.
5- If the paragraph serves two criteria, it is included in them together.
6- Using the previously prepared form to monitor category and unit analysis, and to monitor results.
the reliability of the measurement results means whether the tool was re-applied to the same sample (Adas, 1997: 284). To make sure of this, the researcher analyzed the content of the mathematics book scheduled for the third intermediate grade, then re-analyzed after thirty days, and found the coefficient of reliability using Holsti equation, (Taima, 1987: 187), where the value of the reliability coefficient of the content analysis tool reached (0 , 96), and operations 'reliability coefficient was (0.97), which is a high reliability coefficient.

Chapter Four:
Presentation and interpretation of results
First: Presenting and interpreting the results of the analysis according to content and process standards
To achievement research aims , it should be answer the question : (what is the percentage of the CFBT standards that included in the mathematics course book for the third intermediate grade in the 2020-2021 academic year?), where the CFBT standard were selected, as well as defining its sub-indicators included in the mathematics book
The book was analyzed according to the list of standards, and it was composed of two parts, the first is the content standards and the second the operations standards, so that the content standards included (3) main areas, which are (arithmetic and algebra, geometry and measurement, and data processing) .As for the operations standards, they included a main area (reasoning and solving problems Each of the domains included a set of indicators, whereby the total number of indicators became (61) indicators, and they were distributed among the fields as shown in Table (1)

Table (1) A list of standards for the mathematics course textbook scheduled for the third intermediate grade according to fields and number of indicators

	Standards		**Field**	**Indicators number**
Firstly	Content 'standards	1	Arithmetic and algebra	29
		2	Geometry & measurement	17
Secondly	Operations standards	3	Data processing	7
		1	Thinking & solve problems	8
Total				61

When the researcher applies the analysis tool to the mathematics book for the third intermediate grade, with its first and second parts, and calculates the frequencies and percentages for all fields of content and operations in the book, the researcher arrives at the results that will be presented as follows:

1- Presenting the results of the analysis according to the content standards :

The researcher found the percentage of each of the sub-criteria for the three main areas (fields) in the content of the mathematics course textbook for the third intermediate grade, with its first and second parts, as follows:

1-1-The field of arithmetic and algebra:

The field of arithmetic and algebra consists of three main criteria, including (29) sub-indicators, where the frequencies and ratios were calculated to find out the availability of the field of arithmetic and algebra in the content of the mathematics book for the third intermediate grade with its first and second parts, Table

No. (2) Shows the frequencies and percentages of the field of arithmetic and algebra and its availability in the content of the mathematics book scheduled for the current study:

Table (2) : The results of analyzing the content of the mathematics book for the third intermediate grade in light arithmetic and algebra fields distributed over the chapters of the book.

Chapter	Chapter 'topic	Frequencies	Percentage
First	Real number inequalities and relationships	49	7,58%
Second	Algebraic expressions	260	40,25%
Third	Equations	170	26,32%
Fourth	Coordinates geometry	159	24,61%
Fifth	Geometry & measurement	8	1,24%
Sixth	Statistics and Probabilities	-	0%
Total		646	100%

It is clear from table no. (2) that the second chapter (algebraic expressions) came in first order with a percentage of (40.25%) in the field of arithmetic and algebra from the British CFBT standards, while the third chapter (equations) ranked second with a rate of (26) , 32%)

As for the third rank, the fourth chapter of the book (Coordinate Geometry) got (24.61%), while the first chapter (Relationships and Inequalities in Real Numbers) came in fourth rank with a percentage of (7.58%), which is the lowest percentage compared to the first chapters that concerned with a field Arithmetic and algebra , The researcher attributes the reason to the fact that some subjects such as (applications, sequences, and inequalities) did not receive any indication from the British standards (CFBT) in the third intermediate grade, while the fifth chapter (engineering and measurement) ranked fifth, at a rate of (1.24%).), While the sixth chapter (Statistics and Probability) got (0%) ranked sixth and last

1-2-Engineering and Measurement Field:

The field of engineering and measurement consists of three main criteria, including (17) sub-indicators, where the frequencies and ratios were calculated to find out the availability of the field of geometry and measurement in the content of the mathematics book for the third intermediate grade, with its first and second parts, Table No. (3), shows the frequencies and percentages for this field and their availability In the content of the mathematics book scheduled for the current study

Table (3) Results of analyzing the content of mathematics book for the third intermediate grade in the light of engineering and measurement 'field distributed over the chapters of the book

Chapter	Chapter 'topic	Frequencies	Percentage
First	Real number inequalities and relationships	-	0%
Second	Algebraic expressions	-	0%
Third	Equations	-	0%
Fourth	Coordinates geometry	98	31.42%
Fifth	Geometry & measurement	214	68.59%
Sixth	Statistics and Probabilities	-	0%
Total		312	100%

It is evident from Table No. (3) that the fifth chapter (Engineering and Measurement) obtained the highest percentage (68.59%) in the field of engineering and measurement from the British CFBT standards, while the fourth chapter (Coordinate Engineering) ranked second with

(31.41%), while the first (relations and inequalities in real numbers), the second (algebraic expressions), the third (equations), and the sixth (statistics and probabilities) came in the third and last places with a percentage of (0%)

1-3-The field of data processing:

The field of data processing consists of one main criterion, which includes (7) sub-indicators, where the frequencies and ratios were calculated to find out the availability of the field of data processing, especially in the principles of statistics and probabilities in the content of the mathematics book for the third intermediate grade, in its first and second parts, and Table No. (4), shows the frequencies The percentages for this field and their availability in the content of the mathematics book scheduled for the current study:

Table (4) The results of analyzing the content of the mathematics book for the third intermediate grade in the light of the field of data processing distributed over the chapters of the book

Chapter	Chapter 'topic	Frequencies	Percentage
First	Real number inequalities and relationships	-	0%
Second	Algebraic expressions	-	0%
Third	Equations	-	0%
Fourth	Coordinates geometry	-	0%
Fifth	Geometry & measurement	-	0%
Sixth	Statistics and Probabilities	123	100%
Total		123	100%

It is evident from Table (4) that the sixth chapter (Statistics and Probabilities) received all the indicators in the first rank with a percentage of (100%). This is due to this chapter was specialized in the field of data processing with its two branches, Statistics and Probability, while the remaining chapters were ranked second and last, with a percentage of (zero%).

Table (5) Results of content standards analysis for the mathematics book for the third intermediate grade, in its first and second parts

The major field	Frequencies	Percentage
Arithmetic and algebra	646	60%
Geometry & measurement	312	29%
Data processing	123	11%
Total	1081	100%

It is clear from Table No. (5), that the mathematics book for the third intermediate grade, in its first and second parts, contains most of the CFBT standards for content, and the field of arithmetic and algebra has achieved the highest percentage (60%). Standards of arithmetic and algebra are developed among students, which helps them face future difficulties by possessing these standards, while the field of engineering and measurement came in the second degree by (29%), and the field of data processing represented by the principles of statistics and probability ranked third by (11%)

2-Presentation of the analysis' results according operations standards:

When applying the content analysis tool and calculating the frequencies and percentages for each sub-criterion of the CFBT standards for operations in the book of the third grade intermediate, the results appeared as shown in Table (6).

Table (6) Analyzing 'results of the mathematics book content for the third intermediate grade in the light of operations standards Distributed over the book chapters.

Chapter	Chapter 'topic	Frequencies	Percentage
First	Real number inequalities and relationships	4	2,82%
Second	Algebraic expressions	25	17,60%
Third	Equations	14	9,86%
Fourth	Coordinates geometry	43	30,28%
Fifth	Geometry & measurement	33	23,24%

Sixth	Statistics and Probabilities	23	16,20%
Total		142	100%

It is clear from Table No. (6) that the fourth semester (Coordinate Engineering) received the highest percentage of operations standards, which is (30.28%), while the Fifth Chapter (Engineering and Measurement) ranked second with (23.24%). While the second chapter (algebraic quantities) came in the third place with a percentage of (17.60%), while the sixth chapter (statistics and probabilities) ranked fourth with a percentage of (16.20%), and the third chapter (equations) came in the fifth place with a percentage of (9,86%), while the first quarter (Relationships and Inequalities in Real Numbers) ranked sixth and last with a rate (2,82%).

Table (7) The percentage of the area of reasoning and problem solving of the content of the book as a whole

Type of the major field	**Indicators of reasoning and problem solving**	**Frequency of content indicator**	**The percentage of occurrences of indicators of thinking and solving problems from the content**
Total	142	1081	13%

It is evident from Table No. (7) that the number frequencies of the operations indicators standards represented in their main field (reasoning and solving problems) has reached (142) out of the total frequencies of the content, which is (1081) in the mathematics textbook for the third intermediate grade, with its first and second parts. Thus, the frequencies percentage of reasoning and solving problems of the content is equal (13%).

Interpretation of results:

It is clear from the percentages in Table (5) for the analysis of the mathematics textbook for the third intermediate grade in its first and second parts for the academic year 2020-2021 AD, appearance of varying percentages , hence a high percentage appeared in the field of arithmetic and algebra, which amounted to (60%),

The researcher believes that the reason for this is due to the interest of specialists in writing the book about arithmetic and algebra and its importance in the third intermediate grade , as a contribution to prepare students and provide them with sufficient information in this field and prepare them for the advanced stages. As well as the more the student progresses in the educational stage ,the more mathematics is based on the topics of arithmetic and algebra, as the standards in the field of arithmetic and algebra focus on the numerical system, the system of writing integers and decimals, fractions, negative numbers, percentages, numbers written in standard exponential form, writing and solving linear and quadratic equations and simultaneous linear equations in two unknowns Along with matches and graphs.

As for the field of geometry and measurement, it achieved a percentage of (29%), which is the second order after arithmetic and algebra, and the researcher believes that the reason is the interest in other mathematical subjects such as arithmetic and algebra. And give a small part of the content to the subject of geometry and measurement in proportion to the age of students, as the standards in the field of geometry and measurement focus on proportions and measurements in triangles and circle, polygons and polygons (pyramid and cone), trigonometric ratios, and the distance between two points and the midpoint. All geometry and measurement indicators appeared in the second part of the mathematics book and in the fourth and fifth chapters. This is due to the fact that the mathematics book for the third grade and its two parts is an integrated and sequential book in proposing mathematical topics.

As for the field of data processing, it achieved a rate of (11%), which is the third and last place in the content standards, and the researcher believes that the reason for this result is the belief of specialists in the inability of students at this stage to understand higher topics in the principles of statistics and probability, as well as that they do not constitute High importance compared to other topics in this study stage, as standards in the field of data processing focus on collecting, organizing, analyzing and interpreting data, creating and interpreting frequency charts, comparing experimental and theoretical probability, frequencies and ratios as an estimate of probability, and calculating the arithmetic mean, range, median and mode, and all have emerged Data Processing Indicators in the sixth semester of the second part of the mathematics textbook for the third intermediate grade.

As for the criteria for operations, the percentage appeared at (13%) as a general percentage of the content to record the indicators of the field of reasoning and solving mathematical problems in the mathematics book for the third intermediate grade and its first and second parts, as the criteria related to the content (arithmetic and algebra, geometry and measurement, and data processing) include knowledge And the skills and understanding that the student should master

The area of reasoning and problem solving includes the more comprehensive and higher-order skills necessary for solving mathematical problems. Thus, the criteria for reasoning and problem solving are applied to every content area, as they must be taught and evaluated simultaneously with other areas of mathematics. Therefore, all standards in this field are available in all chapters of the mathematics book, But it came in small proportions compared to the content standards, and the reason for the emergence of a small number of indicators in the field of reasoning and solving mathematical problems is the inability of the student at this stage to use this type of problem a lot and focus on other areas as a prelude to the preparatory stage to use it wisely.

Second: conclusions

1- The content of the mathematics book for the third intermediate grade for the academic year (202-2021 AD) contains most of the British (CFBT) standards.

2- The mathematics book lacks some indicators, especially indicators that are concerned with the use of computer technology means.

Third: Recommendations:

1- Conducting more research and studies on the new Iraqi curricula by analyzing the content in light of (CFBT) standards and for all stages.

2- Working on developing standards for the Iraqi mathematics curriculum, based on international standards, in particular CFBT standards.

Fourth: Proposals:

1- Conducting other similar studies at different educational stages in order to achieve image integrity in front of curriculum designers.

2- Conducting a comparative study between (NCTM) standards and (CFBT) standards for mathematics, and determining the most suitable for the Iraqi environment from the experts' point of view.

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