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# CÁTEDRA

## Percepción sobre los libros de texto en la enseñanza-aprendizaje de la Matemática

### *Perception about textbooks in math teaching-learning of Mathematics*

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### Resumen

Los libros de texto son un recurso necesario en el proceso de enseñanza-aprendizaje de las ciencias y deben considerar, entre otros, a los elementos curriculares: objetivos de



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aprendizaje, contenidos matemáticos y evaluación. Esta investigación tiene como propósito determinar el nivel de satisfacción que el desarrollo de estos elementos genera en estudiantes y docentes, expresados en estos libros que se utilizan en el sistema educativo ecuatoriano. Cabe recalcar que el Ministerio de Educación dota de manera gratuita este material escolar a todas las instituciones públicas del país y, por lo tanto, motiva a investigar sobre su aplicación y uso. Este estudio tiene enfoque cuantitativo y es de nivel exploratorio y descriptivo, por lo que se usó un instrumento de observación para la recolección de datos. Los resultados se expresan por niveles de escolaridad tanto de la Educación General Básica subnivel Superior como del Bachillerato General Unificado y por los elementos curriculares estudiados. Finalmente, se concluyó que los objetivos propuestos para el Bachillerato General Unificado tienen un nivel de satisfacción mayor que los declarados para la Educación General Básica, asimismo, se concluyó para ambos niveles que existe un mediano nivel de satisfacción de los elementos investigados en los libros de texto, lo que significa que los estudiantes que los utilizan no están orientados para continuar aprendizajes más complejos.

## Palabras clave

Currículo, enseñanza-aprendizaje, evaluación, Matemática, objetivos de aprendizaje, textos escolares.

## Abstract

Textbooks are a necessary resource in the science teaching-learning process and should consider, among others, the curricular elements: learning objectives, mathematical content and evaluation. The purpose of this research is to determine the level of satisfaction that the development of these elements generates in students and teachers, expressed in these textbooks used in the Ecuadorian educational system. It should be noted that the Ministry of Education provides this school material free of charge to all public institutions in the country and, therefore, motivates research on its application and use. This study has a quantitative approach and is exploratory and descriptive, so an observation instrument was used for data collection. The results are expressed by levels of schooling of both the General Basic Education sub-level and the General Unified Baccalaureate and by the curricular elements studied. Finally, it was concluded that the objectives proposed for the Unified General Baccalaureate have a higher level of satisfaction than those declared for General Basic Education. It was also concluded for both levels that there is a medium level of satisfaction with the elements investigated in the textbooks, which means that the students who use them are not oriented to continue with more complex learning.

## Keywords

Curriculum, evaluation, learning objectives, Math, school texts, teaching-learning.

## 1. Introduction

The evaluation applied to the country's students indicates that in the subject of Mathematics they do not reach the minimum levels of approval, in relation to the standards proposed by the Ministry of Education (MINEDUC). As Puente states, the results of the Ser Bachiller tests in 2015-2016, applied to more than one hundred thousand students, were: Mathematics 743 points, Language and Literature 786 points, Natural Sciences 771 points and Social Studies 856 points (Puente, 2016, p. 1). Then, in view of such results, it is worth asking: what factors influence these low scores? The answers are multiple and of diverse nature: social, cultural, economic, school, family, personal, among others. In addition, they are directly



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related to aspects of the teaching-learning process: the limited education and training of teachers in mathematics and didactics of mathematics, the resources available do not contribute to the development of the contents of the subject, students are fearful and demotivated, the classroom educational processes are poorly conceived and applied, the evaluation instruments are not pertinent, among many others.

The teaching-learning process demands the use of didactic resources, of the many that exist. Despite the variety of resources and technological advances linked to the educational field, especially in the area of Mathematics, textbooks continue to be an indispensable support during the process. "The textbook is an important resource to carry out the mathematics curriculum and didactic programming effectively, but it is not the only one" (García, 2014, p. 1). Teachers use textbooks to develop the contents of the subject that are organized in the curricular grids of each school year, as well as students have the texts delivered free of charge and must be used in a mandatory manner in the development of Mathematics classes.

In terms of structure, the textbooks delivered to all students at the levels of Educación General Básica (EGB) Superior and Bachillerato General Unificado (BGU) present the following characteristics: 2016 editions, their authorship is the responsibility of MINEDUC, they are organized in thematic units and have an average number of pages of 283 in EGB Superior and 255 in BGU. Finally, they consider the title page, table of contents, contents, glossary, bibliography and webgraphy. The revision of the textbooks was carried out by the Salesian Polytechnic University. The synopsis of all textbooks reads as follows:

This textbook that you have in your hands is a very important tool for you to develop learning in the best way. A textbook should not be the only source of research and discovery, but it is always a good ally that allows you to discover for yourself the wonder of learning. The Ministry of Education has made a curricular adjustment that seeks better learning opportunities for all students in the country within the framework of a project that favors their full personal development and their integration into a society guided by the principles of Good Living, democratic participation and harmonious coexistence (Ministerio de Educación del Ecuador, 2016, p. 1).

Under these approaches, the following research questions are formulated: in what way are the textbooks used by students of the EGB Superior sublevel and BGU structured, and do the textbooks for learning Mathematics satisfy and are they coherent between objectives, contents and evaluation? In order to answer these questions, the general objective of the research is to determine the level of satisfaction generated by the development of objectives, contents and evaluation expressed in the textbooks used in the EGB Superior and BGU of the Ecuadorian educational system. From this, the following specific objectives are broken down as follows:

1. To identify the curricular elements: objectives, contents and evaluation, applied in the textbooks of both the EGB Superior and BGU levels.
2. To establish how mathematical contents are developed in the textbooks.
3. To describe the level of satisfaction established, by years, in the curricular elements formulated in the textbooks.

Despite the educational reforms of recent years, Fernández and Caballero emphasize that the use of mathematics textbooks is and will continue to be a widespread practice in classrooms. Its grounding in the student's experiences and its linkage with advances and



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innovations in the scientific field is imperative (Fernández and Caballero, 2017, p. 202). Therefore, analyzing the learning objectives, contents and evaluation of this resource allows determining whether it meets expectations, so that students have a methodological support to achieve knowledge and develop mathematical reasoning and learning in relation to the level of schooling and its respective sequentiality.

According to Fernández and Caballero, a textbook does not replace the teacher, does not limit the development of methodologies and does not turn learning into a process of repetition and memorization (Fernández and Caballero, 2017, p. 205). On the contrary, diversifying the use of didactic resources in the teaching-learning process of Mathematics contributes to the fulfillment of the expected achievements and to face the current demands of 21st century education. From this perspective, research on mathematics textbooks requires deepening the objectives, contents and evaluation of learning, approaching the study from different disciplines and contexts, generating spaces for discussion and orienting this resource towards an interdisciplinary approach.

The present research is developed with the following structure: review of the literature, where it is based on Mathematics textbooks, specifying their learning objectives, mathematical contents and evaluation; methods and materials, detailing the design of the study and its data collection instrument; results and discussion, grouped by the curricular elements named as criteria (objectives, contents and evaluation) and levels of schooling (EGB Superior and BGU); and, finally, the pertinent conclusions are established.

## 2. Literature review

The Constitution of the Republic of Ecuador states that public education is free and that it is mandatory for all children and adolescents to attend and complete General Basic Education and High School (Constitution of the Republic of Ecuador, 2008, Article 28). With this decision, among other measures, textbooks are provided free of charge for the fundamental areas: Mathematics, Language and Literature, Social Sciences and Natural Sciences, so that textbooks have become widespread at these levels. Moreover, these texts play different roles: object of study, reference material, record of student activities, collection of proposed exercises and problems to be solved. Choppin (1993) considers the textbook to be:

At the same time, it supports knowledge in that it imposes a distribution and a hierarchy of knowledge and contributes to forging the intellectual scaffolding of both students and teachers; it is an instrument of power, given that it contributes to the linguistic standardization of the discipline, to cultural leveling and to the propagation of dominant ideas (pp. 165-185).

The textbooks delivered for the teaching of Mathematics must also comply with the orientations expressed in the New Curriculum 2016 for EGB and BGU. Textbooks, for Nortes and Nortes (2011), "are aimed at developing the contents established by the educational decrees corresponding to the different levels of compulsory education [and conclude that] they have played a preponderant role in the teaching-learning process of mathematics" (pp. 68-69). Similarly, García (2014) expresses that "the mathematics textbook was and still is considered as one of the most important resources for the teaching and learning of mathematics" (p. 4).

Also, it is worth taking into account that Unesco, through Flotts et al. conducted a study that compared and analyzed the Mathematics curriculum documents of the countries participating in the Third Regional Comparative and Explanatory Study (TERCE) and other



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inputs, such as textbooks (Flotts et al., 2016, p. 26). Also, it allows recognizing the development of problem-solving skills as a central axis of mathematics education.

According to Standaert and Troch (2011), "a good use of the textbook, moreover, depends, to a large extent, on the attitude of the teacher and the starting situation of the students" (p. 108), so an adequate classroom process will start with the review of the prerequisites and the motivation of the participants. Textbooks become important when they, by themselves, captivate students to use them.

With regard to the characteristics of a good textbook, Creemers mentions the following:

1. It provides practical exercises that respond to the objective of the subject of study.
2. The subject matter is not overloaded.
3. The contents respond to the teaching objectives and are applicable to real life situations.
4. The objectives are clearly stated, organized, and inform the students about what they are expected to learn.
5. The subject matter is explained in a clear and structured way and is responsive to the objectives. In addition, it is presented in a logical sequence, ranging from the simplest to the most complex.
6. They use advance organizers (a notion introduced by Ausubel), which is an explanatory element that appears at the beginning of each new chapter and connects the notions already studied with those that appear next.
7. They provide material for the monitoring and evaluation of the student's progress.
8. They demand feedback in a systematic way.
9. They allow the effective use of class time.
10. They promote student motivation.
11. They provide material for formative evaluation (Creemers, 1991, p. 48).

## 2.1 Learning objectives

The objectives proposed in textbooks are purposes that are formulated to determine what will be done or attempted in class, in other words, they are "aspirations or intentions that can be very interesting and that surely express the need for the student to acquire certain knowledge, abilities, attitudes and/or skills" (Salcedo, 2011, p. 117). The learning processes that are applied require the use of textbooks that support the achievement of learning objectives; therefore, Van Bruggen (1987) states that, "the clearer the central objectives and content, the easier it will be to measure the impact of textbooks on learning achievement" (p. 133).

Consequently, school mathematics focuses on privileging its formative aspect. Also, "objectives comprise the experiences that learners should gain in all learning opportunities offered. They influence the selection of content, methodological strategies and resources, and the evaluation of learning" (Araujo, 2009, p. 9). Thus, textbooks should be considered as support resources that serve to reach the achievements that students should demonstrate at the end of a class.

In the Unesco report, through Flotts et al. it is expressed that an objective of mathematics education is to train people capable of reasoning logically and thinking critically, who master certain knowledge or contents proper to this discipline and are able to apply them in everyday life (Flotts et al., 2016, p. 26). In the educational stage of EGB sublevel Superior and BGU, adolescents must appreciate and understand the significance of numbers and use them properly, as well as the different purposes they have in everyday life. Numerical significance is derived from experiences and actions on real situations, so that,



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progressively, students use numbers to quantify, measure, indicate, order, locate, among others; and develop numerical operations to solve problems of this nature.

## 2.2 Mathematical contents

Textbooks in Ecuador are didactic resources of almost obligatory use by the main actors involved in the teaching-learning process. Parcerisa argues that textbooks condition the type of teaching that takes place when they are used in a closed manner and subjecting students to the learning contents and methodologies of the National Curriculum preset in the document (Parcerisa, 1996, p. 35). Velásquez (2019) according to studies conducted on school texts, adds the following:

Students, teachers, parents and representatives give them a position of high esteem. However, this "bookish" dependence is worrying, because they assume the almost total veracity of the contents and passively presume the good pedagogical and didactic intentions of their mentors (p. 19).

On the other hand, according to Eyzaguirre and Fontaine (1997), "the methodology and contents of textbooks can play a very relevant role if we want a reasonable, realistic, rapid and wide-ranging educational reform that is compatible with a pluralistic society" (p. 340). Thus, textbooks for learning mathematics must incorporate subject contents that follow a logical sequence, both theoretically and didactically.

Therefore, relationships and connections must be established between elements, actions, notions and concepts, which will make it possible to know the conditions that must be met to develop the ability to sequence and understand the facts. In the teaching-learning process, Obaya and Ponce point out that the didactic sequence guides and facilitates practical development. It also encourages research as a methodological tool that allows the construction of concepts, procedures and attitudes as a flexible proposal that can and should be adapted to the concrete reality (Obaya and Ponce, 2007, p. 19).

## 2.3 Evaluation

Evaluation is defined as "a control phase that aims not only at reviewing what has been done but also at analyzing the causes and reasons for certain results" (Duque, 1993, p. 167). Furthermore, "evaluation acquires meaning when it is able to generate information that serves to make decisions and illuminate improvement actions" (Flotts et al., 2016, p. 9). In the educational field, formative assessment and summative or certifying assessment coexist, both of which are linked to the learning that takes place in the classroom. Arribas (2017) defines the following:

Evaluation in its pedagogical, formative dimension, as one more element of the teaching-learning process, is more clearly manifested when the evaluation does not entail a grade or when it does not have repercussions beyond the assessment of the progress of the person concerned (p. 383).

Consequently, formative evaluation is characterized by being orienting, regulating and motivating; it is inclined to assess the student's formation and his way of learning. Its trajectory is monitored, from its starting point to its point of arrival, in order to improve the educational process with respect to the data acquired; it does not require a qualification to be assessed.

For Arribas, evaluation in its summative or certifying dimension requires ascertaining the degree of achievement of the learning objectives by the student, in order to endorse, classify,



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review, retake and reflect based on the results obtained (Arribas, 2017, p. 384). Contrary to formative assessment, summative assessment necessarily has a grade to determine the level of achievement obtained in each learning process.

The correspondence and complementarity between formative and summative evaluation make the evaluative process systematic, participatory, continuous and interpretative, qualitatively and quantitatively. In this regard, Villardón (2006) considers that:

Assessment in its summative function as competency assessment and formative assessment as assessment for the development of competencies [are] two complementary and necessary approaches to the assessment of learning, which lead to a global conception of what assessment should be [...] as an element of competency training (pp. 61-62).

A textbook, for Campanario, is a source of information, tasks, questions and evaluation exercises, to be reviewed by teachers and students in and out of class (Campanario, 2001, p. 352). Similarly, García (2014) argues that "the main uses that teachers give to the books run between a source of information to prepare, teach and evaluate classes and as a database with tasks and exercises that students have to solve" (p. 10). In mathematics textbooks, the evaluation of learning takes on greater force in the proposed activities developed by students.

Specifically, the approach and statements of the problems found in mathematics textbooks influence the student's perception and understanding to solve them, as well as the teacher's perception and understanding to explain them. Fernandez (2010) highlights the consequences of having incorrectly stated problems in the educational task in the mathematics classroom.

When the writing of a problem situation is presented in the classroom, the student takes as a linguistic model what is expressed, retains it and associates it later with the solution content of the situation. The rigor, precision and clarity of the language presented to the student are of exaggerated importance. The problems that are read throughout the school activity are many. And many of them contain semantic, syntactic and mathematical incorrectness in their statements. We read both what is well and badly written, and the interpretations are not so much subject to the meaning of its expression, but to the intuition of that meaning. The fixation of clear ideas cannot have a fragmentary character, but a systemic, integral character. The correct verbal formulation of the problem must be elevated to a priority level, taking excessive care in the presentation of its information (p. 42).

Assessment activities should be designed to show that students learn, understand the concepts and develop their mathematical skills and abilities, such as demonstrating, applying, inferring and formulating. Correctly stated problems, with a good literary and mathematical language, allow measuring, qualitatively and quantitatively, that students acquire and develop the mathematical contents included in the textbooks and that they achieve the learning objectives.



### 3. Methods and materials

The research has a quantitative approach and the results will be expressed in frequencies and percentages. In addition, it is a descriptive study, so it will detail the relevant components of the didactic development of mathematical contents in the textbooks used by teachers and students of the upper sub-level of EGB and the three years of BGU in Ecuador. For this purpose, an extensive bibliographic and documentary research was carried out, in which each of the textbooks, which are the object of study, were analyzed: three of the EGB corresponding to the eighth, ninth and tenth years and three corresponding to the first, second and third years of the BGU.

For the elaboration of the observation guide, presented in Table 1, the suggestions of Standaert and Troch (2011) were taken into account, regarding: objectives, contents, approach, structure, among others, and aspects referring to evaluation were added. Likewise, the indicators were grouped into curricular elements (objectives, contents and evaluation), considered as criteria in this section. Using a Likert-type scale, each indicator was evaluated as follows: Satisfactory (S), Moderately Satisfactory (MS) and Not at all Satisfactory (NS), and numerically with 3, 2 and 1 to each of them, respectively. The instrument was validated by experts and the reliability coefficient, according to Cronbach's alpha calculation, was 0.808, which corresponds to a high level of reliability.

Criteria	Scale		
	S	MS	NS
Objectives			
1. The general objective is clearly and precisely presented.			
2. Specific objectives are formulated for each unit.			
3. The objectives are in line with the contents.			
4. Objectives are targeted for everyone, including people with special educational needs.			
5. The performance criteria skills (DCD) are consistent with the objectives.			
Contents			
6. The concepts are updated and have a scientific basis supported by other books.			
7. It presents a precise summary at the end of each unit.			
8. The development of the contents follows a logical and critical process.			
9. The topics are well explained and detailed.			
10. It contains review exercises that go from the simple to the complex.			
11. Meets the requirements of the National Curriculum.			
12. Contains topics that respond to the student's interest and context.			
13. Incorporates ICT to reinforce and complement the topics.			
14. The topics have a logical sequence.			
15. The text uses vocabulary according to the level of schooling and promotes verbal and written expression.			
16. The proposed exercises are related to the concepts already covered.			
17. The examples presented are coherent with the mathematical concepts.			
18. It fosters interest and motivation, creating links of investigation and autonomous work.			
19. It has a variety of exercises to explain and reinforce the concepts.			
Evaluation			



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- 
20. Proposes exercises or problems that integrate with other areas.
  21. The evaluations at the end of each unit are related to the concepts developed.
  22. The exercises and problems formulated have logic with their answers.
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Table 1. Textbook observation and analysis instrument by criteria.

For the application of the observation guide to textbooks, there were teams of students belonging to the Pedagogy of Experimental Sciences, Mathematics and Physics career of the Universidad Central del Ecuador, in the academic period 2019-2019. Six teams were formed, one for each text, who were trained in the use of the instrument. Finally, the Microsoft Excel program was used for the statistical treatment of the information and the presentation of results.

## 4. Results and discussion

The results of the research and of the observations made on the textbooks analyzed at the EGB Superior and BGU levels, by criteria: objectives, contents and evaluation, and according to the evaluation scale: satisfactory (S), moderately satisfactory (MS) and not at all satisfactory (NS), are shown in tables by levels and years. This allows comparisons to be made between them, contrasting the results by criteria with respect to each year and level.

### 4.1 Results grouped by criteria and years at the Upper GBS level

Table 2 shows the criteria: objectives, contents and evaluation, contrasted with the eighth, ninth and tenth years of Upper Primary School and their respective percentages.

Años	Objectives			Contents			Evaluation		
	S	MS	NS	S	MS	NS	S	MS	NS
8 <sup>th</sup>	8,00	12,00	80,00	27,14	57,14	15,71	33,33	66,67	0,00
9 <sup>th</sup>	5,00	40,00	55,00	27,00	53,00	20,00	50,00	50,00	0,00
10 <sup>th</sup>	26,67	60,00	13,33	30,95	44,05	25,00	11,11	72,22	16,67
Average	13,22	37,33	49,44	28,40	51,40	20,20	31,00	63,00	6,00

Table 2. Results of the analysis of textbooks by criteria and years at the EGB Superior level (in percentages)

In other words, it can be seen that the eighth grade textbooks have 80.00% of not at all satisfactory in the formulation of objectives and only 8.00% are considered satisfactory. Regarding the contents, 57.14% declare that the development of these contents is moderately satisfactory. Meanwhile, for the formulation of evaluation activities, 66.67% declared it moderately satisfactory and 33.33% considered it satisfactory.

In Table 2, for the ninth grade textbooks, 55.00% consider the formulation of objectives not at all satisfactory and 40.00% consider it moderately satisfactory. Regarding the contents, 53.00% of the observations say they are moderately satisfactory and, with respect to the evaluation, 50.00% for satisfactory and the same percentage for moderately satisfactory.

Finally, for the tenth grade textbook, Table 2 shows the following results: 60.00% for moderately satisfactory for the formulation of the objectives, 44.05% also moderately satisfactory for the formulation of the contents and, with respect to the evaluation activities, 72.22% receive the same evaluation.



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In summary, it can be seen that 49.44% of observations are not at all satisfactory for the formulation of the objectives expressed in the textbooks of Upper GBS; it means that this curricular element so important in the teaching-learning process is unknown to the students. Regarding the contents, 51.40% are developed in a moderately satisfactory way and 63.00% declare moderately satisfactory the formulation of evaluation activities. At this level, textbooks applied without adequate mathematical demands and rigor will produce shallow learning and conceptual shortcomings that will affect their subsequent development of mathematical thinking.

#### 4.2 Results grouped by criteria and years at the BGU level

On the other hand, the criteria: objectives, contents and evaluation are contrasted with the first, second and third years of BGU and their respective percentages, as shown in Table 3.

Criteria	Objectives			Contents			Evaluation			
	Años	S	MS	NS	S	MS	NS	S	MS	NS
1 <sup>st</sup>		6,66	66,66	26,66	11,91	61,90	26,19	22,22	66,67	11,11
2 <sup>nd</sup>		14,28	62,86	22,86	14,29	64,28	21,43	28,57	47,62	23,81
3 <sup>rd</sup>		16,67	66,66	16,67	16,67	52,38	30,95	16,67	72,22	11,11
Average		12,54	65,39	22,06	14,29	59,52	26,19	22,48	62,17	15,34

Table 3. Results of textbook analysis by BGU criteria and years (in percentages).

In this sense, it is evident that the textbooks of the first year of BGU are moderately satisfactory in terms of: objectives (66.66%), contents (61.90%) and evaluation (66.67%); while the lowest values correspond to objectives with 6.66% of satisfaction and contents with 11.91%. Evaluation is rated as not at all satisfactory with 11.11%. The evaluation of the objectives (62.86%), contents (64.28%) and evaluation (47.62%) is recurrent in the textbooks of the second year of BGU.

Finally, in the textbooks of the third year of BGU, 72.22% corresponds to moderately satisfactory, the evaluation criterion, followed by the objectives (66.66%) and the contents with 52.38%. Evaluation is considered not at all satisfactory with 11.11%.

In summary, it can be seen that the BGU textbooks are rated as moderately satisfactory in the formulation of objectives, contents and evaluation with 65.39%, 59.52% and 62.17%, respectively, and the lowest value corresponds to the criterion objectives with 12.54%. These evaluations in important curricular elements are insufficient for students to demonstrate the necessary mathematical knowledge to continue with more complex mathematical studies and follow important university careers, closely linked to the use of mathematics: engineering, economics, architecture, statistics, business and education related to numbers; in which they would find many difficulties and limitations.

#### 4.3 Results grouped by criteria and levels Upper EGB and BGU

On the other hand, the results grouped by criteria and levels, compared between EGB Superior and BGU, are shown in Table 4.

Criteria	Objectives			Contents			Evaluation			
	Levels	S	MS	NS	S	MS	NS	S	MS	NS
EGB Superior		13,22	37,33	49,44	28,40	51,40	20,20	31,00	63,00	6,00
BGU		12,54	65,39	22,06	14,29	59,52	26,19	22,48	62,17	15,34



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Average	12,88	51,36	35,75	21,34	55,46	23,20	26,74	62,59	10,67
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Table 4. Results of the analysis of textbooks by criteria and levels EGB Superior and BGU (in percentages)

Table 4 shows the results grouped by levels EGB Superior and BGU in terms of the level of satisfaction or concordance between textbooks and methodological development. The following averages can be observed: regarding the criterion objectives, 51.36% are moderately satisfactory, that is, they are not adequately formulated and are not coherent with each other. Regarding the contents developed, these are also moderately satisfactory (55.46%), which indicates that there are shortcomings and lack of rigor in the approach to mathematical concepts. Finally, in the evaluation criterion, 62.59% is moderately satisfactory, which shows that the proposed problems and exercises are to some extent integrating and keep a certain logical coherence with the mathematical concepts.

However, when contrasting the results obtained in the EGB textbooks (49.44%) with those of the BGU (65.39%), it is observed that for the curricular element -criterion- objectives, the highest percentage corresponds to the BGU textbooks and they are moderately satisfactory, which shows that the teaching-learning activities are better oriented for the achievement of the learning achievements. As for the curricular element contents, there is a small difference in the percentages of both BGU (59.52%) and EGB (51.40%), both are in the moderately satisfactory evaluation. Finally, with regard to the curricular element evaluation, the GBS textbooks have 63.00% while for the BGU it is 62.17% and they are in the moderately satisfactory evaluation. Therefore, much depends on the authors and those responsible for the publication of textbooks to ensure consistency between the EGB and BGU levels in terms of the curricular elements: objectives, content and evaluation.

## 5. Conclusions

From the results and analysis described above on the textbooks used for the teaching and learning of Mathematics, the following conclusions can be drawn:

The books used by students of EGB sublevel Superior and BGU, have a structure that integrates in their thematic units in a uniform way to: objectives, contents, solved exercises, proposed exercises, integrating problems and recommendations for out-of-class tasks. The research and the information analyzed show that with respect to: objectives, contents and evaluation, they moderately meet the expectations of what textbooks should be for the teaching of Mathematics at the level of EGB Superior and BGU. It means, therefore, that the students who use them do not have the methodological support that allows them to achieve the knowledge required to develop more complex mathematical reasoning and learning.

Therefore, if one considers the role of objectives in the teaching-learning process, it is worrying that they are not expressed in some cases or that they are not closely related between the general objectives of the thematic units and the specific objectives. Students and teachers do not have a well-defined purpose for learning and teaching essential concepts in Mathematics. Also, it was observed that in some cases the contents do not have the sequentiality or sequencing required in their foundation and theoretical development, nor do they have the depth and rigor they require. In addition, it is of concern that the evaluation activities are not formulated to demonstrate the understanding of concepts, processes and development of capacities and skills that students must demonstrate and apply. Mathematical exercises and problems are not presented to measure achievements or to integrate the knowledge developed, or these problems are insufficient.

Finally, it is important to emphasize the relevance that should exist in textbooks at the levels investigated between the objectives and the evaluation, since both curricular elements



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make it possible to demonstrate the performance of teachers and students in the teaching-learning process, as well as the rigor with which the thematic content of such an important discipline should be developed. It could well be recommended that the textbooks used for the levels of EGB Superior and BGU, need to be analyzed in depth, in the methodological aspects and the development of the teaching-learning process; that is, in the strategies and techniques that motivate students and teachers to use them in an optimal way.

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