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International Journal of Curriculum and Instruction 13(2) (2021) 1226-1240

IJCI
International Journal of Curriculum and Instruction

Evaluation of a mathematics curriculum in accordance with the Eisner's educational connoisseurship and criticism model

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Abstract

The study aimed to evaluate the 8th grade mathematics curriculum in Turkey, which was revised in 2016-2017 school year, and implemented from 2017-2018 school year on. In the study the Eisner's educational connoisseurship and criticism model was utilized. The participants of the study comprised 15 secondary school mathematics teachers selected by the purposeful sampling method. The study adopted the case study pattern, one of the qualitative research methods. The data were collected via a semi-structured interview form, and analyzed using direct quotations as one of the descriptive data analysis methods. The results revealed that the majority of the participant teachers reflected positive criticisms about the new curriculum in general whereas there were those who made negative comments about some particular features such as, inconsistency between the level and the special aims, the use of the constructivist approach for crowded classes, insufficient content, inconsistency with the readiness of students, inadequate activities to develop students' skills such as correlating, reasoning, and problem-solving.

Keywords: Curriculum evaluation; 8th grade mathematics curriculum; Eisner's educational connoisseurship and criticism model

1. Introduction

In order to keep up with rapidly developing science and technology and raise qualified individuals, there is a need for well-prepared curriculum and continuous improvement of these. Curriculum evaluation studies are needed for the continuous improvement of the curriculum and the determination of the missing and disadvantaged aspects.

Evaluation is a very extensive and comprehensive process. It is important to choose a definition that will guide evaluation studies (Kemmis, 1980). When the curriculum evaluation studies are examined, it is possible to come across many definition of

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curriculum evaluation in the literature. Evaluation can be defined as simply determining the value of something. Therefore, if the curriculum evaluation in its simplest form is defined; it involves activities to judge the value or benefit of a curriculum (Worthen, 1990). Ertürk (2013) defines curriculum evaluation as the complementary element and final step of curriculum development as the process of determining the realization status of the determined goals. Erden (1988) defines the curriculum evaluation as the process of designing, implementing, evaluating and reorganizing in line with the data obtained as a result of the evaluation of the curriculum. Koufman and Thomas (1980) defines the curriculum evaluation as the studies in which various tasks such as deciding about the effectiveness of the curriculum, determining the problems experienced while implementing the curriculum and if any, from which item or elements of the curriculum these problems are originated, and making the necessary corrections. Uşun (2016) defines curriculum evaluation as a decision-making process about any feature such as accuracy, realism, competence, suitability, efficiency, usefulness, effectiveness, success and execution of a curriculum developed using systematic data collection and scientific research processes. While defining curriculum evaluation in education, Kaya (1997) emphasizes the evaluation of the basic elements of the curriculum and defines the curriculum evaluation as the collection, analysis and interpretation of the information for the purpose of judging all the dimensions in a curriculum or the effect, effectiveness and all the outcomes that one or more dimensions may have. Provus (1969) defines curriculum evaluation as a comparison of a determined standard with the performance of the curriculum. Wolf, Evers and Hill (2006) define the curriculum evaluation as the process of collecting and analyzing information from multiple sources to improve student learning in sustainable ways.

Looking at the curriculum evaluation definitions in general terms, it is seen that there are some principles and objectives of curriculum evaluation. In order to better understand the curriculum evaluation, it can be thought that it will be useful to consider the aims and principles in detail.

1.1. The Purpose of Curriculum evaluation

Anderson and Ball (1978) stated the objectives of curriculum evaluation as follows:

- To contribute to the decision-making regarding the configuration of the curriculum
- To contribute to the decisions regarding the continuation, extension or certification of the curriculum
- To contribute to decisions regarding changes to be done in the curriculum
- To gather evidence to support the curriculum
- To gather evidence to challenge the curriculum
- To contribute to the understanding of basic psycho-social and other processes.

It is known that curriculum evaluation serves more than one purpose. Scriven (1967) states that the most important purpose of curriculum evaluation is to reveal the effectiveness and value of the curriculum. Curriculum evaluation serves different purposes, from providing an understanding of how to develop a curriculum or an application to providing evidence of effectiveness and efficiency achieved through the implementation of the curriculum. Curriculum evaluation is carried out with the aim of supporting the renewal and execution of the curriculum, thereby ensuring the continuity of the curriculum (Klenowski, 2010). In addition, curriculum evaluation is carried out with the aim of finding out to what extent the students have reached the goals, determining their deficiencies, determining the rate of effectiveness of the curriculum, determining the effectiveness of the method used and sharing school practices with the society (Marsh & Wills, 2007). Similarly, Wolf *et al.* (2006) stated that curriculum evaluation can serve several main purposes. They emphasized that it is to determine the functioning aspects and the aspects of the curriculum that need to be changed, to evaluate the effectiveness of the changes made before, to show the effectiveness of the current curriculum, to review the needs of the curriculum to meet and to meet professional accreditations.

Although there are some different ideas about the purpose of curriculum evaluation in the literature, the purpose of curriculum evaluation is that it should be kept in mind that the curriculum will change depending on factors such as the definition of the curriculum, the philosophy it is based on, the definition of curriculum evaluation, the expectations of the stakeholders from the curriculum evaluation, the curriculum evaluation approach and the model (Uşun, 2016).

1.2. Eisner's Educational Connoisseurship and Criticism Model

The educational connoisseurship and criticism model was developed by Eisner, known as one of the world's leading art advocates (Kara & Akdağ, 2007). By focusing on qualitative examination in curriculum evaluation, this model, which is separated from the others, aims to perform educational inquiries that supports scientific processes (Uşun, 2016). Evaluators following Eisner's model perform a detailed analysis of students' work. They use teachers' and students' motion movies, video tapes, and voice recordings. They note what is said and done, as well as what is not said and done (Ornstein & Hunkins, 2016). In traditional evaluation models, student performance is evaluated. But as education is concerned with developing the student's intellectual strength and ability, just evaluating the performance of the student is not enough to develop it effectively (Eisner, 1979).

Eisner explains his model with an analogy. In this analogy, if a class is an orchestra, the teachers is the conductor, and the evaluator is the supervisor of the orchestra. Teachers can be so close to their classes that they may no longer hear the symphony as clearly as possible, even as they once were. Here, the evaluator can have a distance to

hear what is happening in the classroom and enlighten the teacher about this. In such a situation, interpersonal skills and trust between teacher and evaluator are very important. The teacher should be willing to be an evaluator in the classroom (Eisner, 1979).

Eisner first defined the evaluation process in three dimensions as description, interpretation and evaluation (Eisner, 1985). Then he added the thematics dimension to these three dimensions (Eisner, 1998). In the description step, the evaluator collects various data by visiting the class environments, meeting the teachers, and eating with the students in student canteens (Kara & Akdağ, 2007). In the interpretation dimension, the events that occur as a result of the program are taken into consideration and various predictions are made and, these are interpreted. In the evaluation dimension, an evaluation is made according to the information obtained from the description and interpretation dimensions (Erden, 1988). In the thematics dimension, similar and repeating items are gathered under certain themes during the evaluation process. Every artistic study has a theme, a given message, as well as in the Educational Connoisseurship and Criticism Model, each case examined has renewed messages, highlighted qualities and dominant features, and these are tried to be figured out (Kara & Akdağ, 2007).

Curriculum evaluation is conducted to approve the program, to continue the program or to answer questions related to the development of the program. Evaluation questions determine the direction and form the basis of the evaluation. Without these questions, evaluation cannot be focused, and the evaluator has difficulty in explaining what is examined, how it is examined and why it is examined (Ornstein & Hunkins, 2016). Therefore, it is very important to select the questions to be prepared before doing this process correctly, in accordance with the targeted and selected curriculum evaluation model in order to perform the curriculum evaluation correctly.

In this study, it was aimed to evaluate the 8th grade mathematics curriculum by using Eisner's educational connoisseurship and criticism model. While the educational connoisseurship and criticism model was applied, it was deemed suitable to be used in this study since it allowed to reach various themes by describing the program and making various interpretations and evaluations around these descriptions. The program was evaluated with its all aspects within the framework of Eisner's model through views of the teachers. In this context, the problem statement of the study was formulated as; ***"What are the opinions of the teachers regarding the evaluation of the 8th grade mathematics curriculum?"*** Within the scope of this main research question, the sub-research questions were determined as follows:

1. How do the teachers describe the 8th grade mathematics curriculum?
2. How do the teachers interpret the 8th grade mathematics curriculum?

3. How do teachers evaluate the 8th grade mathematics curriculum?
4. What are the themes that teachers stated for 8th grade mathematics curriculum?

2. Method

2.1. Research Design

The design of the study was a case study among qualitative research designs. Not just one person is dealt with and evaluated in the case study. What is being studied can be a group, a field, an innovation, an event or a program (Mertens, 2010; Rabson & McCarten, 2016).

2.2. Participants

The participants consisted of 15 secondary school mathematics teachers in the province of Erzurum in the 2019-2020 school year, and were selected through maximum variation sampling method among purposeful sampling methods. In the maximum variation sampling method, the aim is to capture the central themes that cause a lot of variation (Patton, 2002). In the study, variation was achieved by paying attention to choosing the sample from different levels of schools and teachers with different professional seniority. Demographic information about the study group is indicated in Table 1 below.

Table 1. Demographic information about the study group

Demographic Information		Frequency
Gender	Female	4
	Male	11
Education status	Bachelor's Degree	12
	Master's Degree	3
Professional Seniority	1-5	1
	6-10	11
	11-15	3

According to Table 1, 11 of the teachers participating in the study are males and 4 are females. When it is analyzed in terms of education, it is understood that 12 of them have bachelor's degree and 3 of them have master's degree. In terms of professional seniority variable, 1 has 1-5 years of seniority, 11 has 6-10 years of seniority and 3 has 11-15 years of seniority.

2.3. Instruments and Data Collection

In the study, Eisner's Educational Connoisseurship and Criticism Model was adopted and for that purpose, a semi-structured interview form was used as data collection tool. The interview form was prepared primarily as a draft form by reviewing the relevant literature. Necessary corrections were made after consulting the experts from the field.

After the corrections were made, the expert opinion was asked again. The corrections were found appropriate and the form was finalized.

The interview form was composed of 14 questions in total; 3 questions were prepared to collect information about the demographic characteristics of the teachers and 11 questions prepared to collect information about the mathematics curriculum. 6 of these 11 questions related to the descriptive step, 3 of them to the interpretation step and 2 to the evaluation step.

2.4. Data Analysis

As one of the descriptive analysis methods the direct quotations was used in the research. In the descriptive analysis method, the data are reviewed, summarized, and interpreted within the scope of the dimensions determined by the previously determined theme or research questions. Direct quotations are often included to present the findings obtained in the research in an interpreted manner (Yıldırım & Şimşek, 2006).

The descriptive analysis method consists of four phases: frame-building, processing of data according to the thematic frame, identification and interpretation of findings. First, the framework of the study is determined by making use of the conceptual framework of the study or the dimensions found in the interviews and observations. In the next step, data is read and edited around the predetermined frame. The findings organized in the third step are defined and the data is supported by direct quotations where necessary. The findings identified in the last stage are related, explained and made significant (Yıldırım & Şimşek, 2006). In the study, some anecdotes and codings made in the general framework are included. While writing the opinions of the teachers, the teachers who participated in the interview were coded as T.1, T.2, T.3,…, T.15. The data were sometimes described with the themes determined within the frame of the questions in the interview protocol, and the descriptions made were interpreted. While making the interpretation, direct quotations are included in order to reveal the opinions of the experts about the curriculum more clearly and to support the defended opinions.

3. Results

The findings of the study were prepared within the framework of Eisner's Educational Connoisseurship and Criticism Model. Information about the mathematics curriculum and its application was reached during the description phase. Using this information, various interpretations and evaluations are included. As a result, themes related to the program were created.

3.1. Results and Interpretation for the First Sub-research question

The first sub-research question of the study was determined as "How do the teachers describe the 8th grade mathematics curriculum?" In order to find an answer to this question, the curriculum was tried to be described by asking questions about the situations faced by teachers when applying the 8th grade mathematics curriculum.

When the answers of the teachers about the question "What are your thoughts on the implementation of the new curriculum using the constructivist approach?" are examined, the vast majority of teachers argued that the program allows them to teach in accordance with the constructivist approach. The answers given by some of the teachers regarding this question are as follows.

T.9: *I think the curriculum is suitable for the constructivist approach. However, in order for the constructivist approach to be applied in the classroom, more time must be allocated to some acquisitions.*

T.3: *The curriculum is suitable for the constructivist approach. However, constructivist approach, which is a student-centered approach, is not included enough because classrooms in some schools are crowded, teachers do not have much knowledge in practicing class activities related to the constructivist approach, especially because students in the 8th grade are preparing for a difficult exam such as LGS (high school entrance exam), much time is not spared for the activities but it is spared for solving problems. Even if the program is structured in a more accurate way, the constructivist approach is not used as required due to such reasons.*

In order to describe how teachers applied the 8th grade mathematics curriculum in the process, the following questions were asked to the teachers.

1-) What strategies, methods and techniques do you use when implementing the curriculum? Why?
2-) What materials do you use when implementing the curriculum?
3-) Which measurement tools do you use when evaluating students? Why?

The teachers' answers to these questions are summarized in the table below.

Table 2. Strategy, method technique, material and measurement tools used by teachers

Strategy, method technique, material and measurement tools		Frequency
Strategies, methods and techniques used	Expository teaching method	15
	Discovery teaching method	13
	Question answer	12
	Educational games	10
	Problem-solving	10
	Cooperative learning	2
	Case study	4
	Peer teaching	10
Materials	Smart board	15
	Textbook	15
	Tablet	2
	Z books	13
Measuring Tools	Gap-filling questions	14
	Multiple choice questions	15
	Performance tasks	14
	True-false questions	14
	Open-ended questions	14

As can be seen from Table 2, teachers use various methods, techniques, measurement tools and materials while applying the 8th grade mathematics curriculum. When the data are analyzed, it is understood that the teachers stated that they used different strategies, methods and techniques in the course. When the materials used by teachers in their lessons are analyzed, it is concluded that the use of smart boards and textbooks is most common, and all teachers use these materials in their lessons. Besides these materials, the z book is also widely used. It was determined that 13 teachers used z books so that almost all of the teachers used z books. It is understood that tablets were used by 2 mathematics teachers. It can be stated that tablets are used less by teachers compared to other materials. When the measurement tools used by teachers when implementing the curriculum were examined, it was determined that almost all of the teachers included gap-filling questions, multiple choice questions, true-false questions, performance tasks and open-ended questions. It was concluded that teachers did not use a single measurement tool while applying the 8th grade mathematics curriculum.

Many of the teachers responded to the question of "What could be the reason for the program change in 2017?" as it may have changed due to the needs of the age and the subjects in the previous program were very intense, the acquisitions were not suitable for the level of students' readiness one of the teachers answered this question as follows:

T.1: *The education system is a dynamic process. It is open to change and development. The previous curriculum was overwhelming for many students in terms of subjects. In order to explain the subjects as soon as possible and catch up with the annual plan, we had to conduct and pass the lessons that we had to do with a constructivist approach mostly with traditional methods. At the moment, since the curriculum is not very intense, the lessons are more suitable for a student-centered teaching.*

Most of the teachers responded negatively to the question "What are your comments about the level of achievement of the specific objectives of the renewed curriculum of mathematics?" Although it was emphasized that the current curriculum was better in this regard than the previous program, it was stated that the mathematics lesson was insufficient to fulfill all the specific objectives.

Some teachers' answer to this question is as follows:

T.11: *I think the new curriculum is sufficient in terms of relating subjects to daily life. The program is not sufficient at the level of achieving the purpose of realizing the relation of mathematics with art and aesthetics, which is one of the specific purposes. The relationship between mathematics and art and aesthetics could be included more by giving a little less place to the achievements related to geometry. In addition, acquisitions appropriate to specific purposes like valuing mathematics and realizing that mathematics is a common value can be included, and these can be taught in the lessons including such reading texts related to these subjects in the textbooks. Acquisitions can be added for the specific purpose of encouraging to search, and research questions can be included in textbooks.*

T.10: *I find the curriculum inadequate to realize the specific objectives of the mathematics lesson. Because I think there is only content restriction in the curriculum. Although this seems to be positive enough to affect students' success in low-level behavior, I do not think it will contribute to achieving specific goals.*

3.2. Results and Interpretation for the Second Sub-research question

The second sub problem of the study is as "How do the teachers interpret the 8th grade mathematics curriculum?" Various comments and predictions about the curriculum were made by making use of the opinions of teachers for this sub-research question.

Many of the teachers gave positive answers to the question "How do you interpret the achievements of the program?" Many of the teachers stated that the achievements are appropriate for the students' levels and that the order is correct.

On the question "How do you interpret the new curriculum in terms of content", the teachers stated that the content is sufficient. However, some teachers stated that there are some subjects that should be added to the content and some should be removed. Direct quotations of some teachers' answers to this question are as follows:

T.7: *Algebraic expressions, factorization and identity subjects can be extracted from the content of 8th grade mathematics curriculum. I think these subjects are more suitable for secondary education.*

T. 8: *The program is generally sufficient in terms of content. But I think that it is not right for some important subjects to be taught at the end of the year and that the topics such as circle, prism volume, cylinder are only included once in one of the 5th,6th,7th and 8th grade levels.*

The answer of all the teachers to the question "What are your thoughts about the acquisitions of the curriculum and the compatibility of the content with each other" is that the acquisitions of the curriculum and the content are compatible with each other. When the answers given by the teachers to the questions were examined, it was determined that the curriculum was sufficient and positive in terms of many features. However, according to teachers' opinions, some aspects of the curriculum were still not at the desired and expected levels. The teachers described the curriculum change as fit and proper. However, it was emphasized that this change was only beneficial for the students to gain the acquisitions by decreasing the acquisitions and that they were insufficient to realize the specific objectives of the mathematics lesson.

The curriculum was found positive by almost all teachers in terms of acquisitions, content and content-acquisition compatibility. The acquisitions in the curriculum have been simplified compared to the previous curriculum and made appropriate for the students' levels. It was expressed by T.3, T.5 and T.13 that the topics such as algebraic expressions, equations and identities for the 8th grade curriculum are not suitable for the level of the students. It is also noteworthy that a teacher commented that some topics are included in the curriculum in spiral learning, but some topics are included only once in the curriculum.

It was concluded that the curriculum was prepared in accordance with the constructivist approach, but some teachers do not know how to apply the activities according to the constructivist approach, and since the activities organized with the constructivist approach take a lot of time, the teachers tend to use the traditional methods most of the time. It was stated that preparing students for the high school

entrance exam directed teachers to do questions rather than the activities that would bring them to the acquisitions.

3.3. Results and Interpretation for the Third Sub-research question

The third sub-research question of the study is " How do teachers evaluate the 8th grade mathematics curriculum?" Evaluations regarding the curriculum were made by utilizing the opinions of teachers for this sub-research question.

Teachers generally responded positively to the question "What are the positive and negative aspects of the materials intended for use in the curriculum?" It was stated by T.5, T.7, T.9 and T.15 that the textbooks are suitable for the students' levels, but they are not similar to the questions in the high school entrance exam. It has been stated by T.1., T.3., T.5, that the smartboard brings a revolutionary change in education and is very useful for ensuring the effectiveness of the curriculum.

Some of the teachers stated that Education Information Network (EBA) has an important role in increasing the effectiveness of the curriculum, but few of the questions here have functions such as being related to daily life, directing students to establish logical relationships and interpret (T.11, T.12, T.13).

The response of the teachers to the question “How do you find the curriculum in terms of meeting the needs” has been found to be positive in general, but there are also teachers who criticize the curriculum in terms of meeting the needs. Some evaluations about this are as follows:

T.1: *The curriculum can meet the needs to an adequate extent. However, it is not sufficient to encourage students to think mathematically. As, in my opinion, the purpose of mathematics is to create a mathematical understanding for students and to create logical thinking skills and strategies. The flawed part of the curriculum is that such effects cannot be observed in students.*

T.4: *The program is generally sufficient to meet the needs. However, it is insufficient to enable students to develop their skills such as interpreting and correlating. In addition, students are very weak in terms of problem-solving skills. In the curriculum, problem-solving activities are included less than they should be.*

T.13: *In the curriculum, the content associated with daily life and the appropriate acquisitions are needed more.*

3.4. Results and Interpretation for the Fourth Sub-research question

The fourth sub-research question of the study is “What are the themes that teachers state about the 8th grade mathematics curriculum?” Various themes related to the curriculum evaluation study for this sub-research question have been reached.

While evaluating the 8th grade mathematics curriculum, some of the repeated and highlighted aspects of the curriculum are themed as follows.

- Reducing the acquisitions in the renewed curriculum compared to the former one is beneficial in terms of time span, labor and quality,

-The curriculum is insufficient in bringing the specific objectives of mathematics to students,

- Some teachers have difficulties in the implementation of the curriculum in accordance with the constructivist approach due to the lack of information on how to gain the activities,

- In some crowded classes, there are difficulties in implementing the activities required by the constructivist approach,

- Even though they are not among the general and specific objectives of the curriculum, especially in 8th grades, teachers find themselves expecting to solve many questions with students and raise their correct answers due to the preparation of the high school entrance exam held at the end of the year,

-Teachers use more than one method, technique and strategies such as question-answer, expository method of teaching, discovery teaching method, problem-solving, etc.

- The curriculum is at the desired level regarding acquisition, content, acquisition-content harmony,

- Teachers evaluate students with more than one measurement tool as requested in the curriculum such as multiple choice, true-false, open-ended, gap filling, performance evaluation,

- The teachers find the change done in the curriculum in 2017 fit and proper,

-The materials presented in the curriculum such as smart board, EBA, z book, textbook are found to be positive and that they use them effectively while implementing the curriculum,

-Questions that can direct the students to research and to realize the specific objectives of mathematics (problem-solving, correlating, etc.) should be added to the questions in the EBA and textbook.

4. Discussion and Conclusion

The curriculum evaluation study conducted was evaluated within the context of Eisner's educational connoisseurship and criticism model. The teachers expressed positive opinions about the renewed mathematics curriculum in general. Uşun and Karagöz (2009), Marshal and Herbert (1982), Köse (2011), Aksu (2008), Çakır and Kılınç (2016) concluded in their study that the majority of teachers gave positive opinions about the mathematics curriculum. In their study, Riordan and Noyce (2001) stated positive opinions about the new program with the conclusion that the new curriculum is more effective in student achievements than the traditional program.

The curriculum has been simplified in terms of various acquisitions and content. This enabled time to be used more effectively and acquisitions can be achieved more easily. This result is consistent with the conclusion that "the curriculum has been simplified in terms of content and achievement" reached by İlhan and Aslaner (2019). In their study, Altındağ and Korkmaz (2019) concluded that the simplification of the acquisitions in the curriculum was appropriate in terms of being student-oriented, however, they concluded that the program was negative in terms of being oriented

towards conceptual learning. In the study of Beyendi (2018), it was concluded that the acquisition and content were decreased compared to 2013 by evaluating the mathematics curriculum from 2013 to 2018. This result supports the results of this research.

It is concluded that the curriculum is suitable for the constructivist approach, the acquisitions of the curriculum are feasible, largely suitable for the student level and compatible with the content. In their study based on the opinions of teachers, Uşun and Karagöz (2009) found that many of the teachers find that the acquisitions are consistent with the general objectives of the mathematics course, responding to the needs of the students, appropriate to the developmental characteristics, and developing correlating and problem solving skills. These results support the results of our research.

It was determined that teachers use various materials that involve various strategies, methods and techniques in the implementation of the curriculum, they do not tend to use a single measurement tool and use various materials. This is an indication that the curriculum is suitable for an effective implementation. In his study, Dai (2019) determined that the opinions of the classroom teachers about the level of knowledge about measurement tools in elementary school mathematics curriculum are generally very good and that teachers use various measurement tools in their lessons. These results support the findings of our research.

One of the results obtained according to the opinions of the teachers is that the curriculum can meet most of the needs. Derry (2019) determined that the mathematics curriculum he examined in his study meet the needs of the students, which supports this finding of our research. However, there are also various criticisms about this issue. Teachers find the materials such as smartboard, EBA, textbook provided by the program functional and appropriate. But some criticism has been made about these. Some teachers think that the questions in the textbook are not suitable for the LGS (high school entrance exam) held at the end of the 8th grade. Güler, Arslan and Çelik (2019) concluded that the achievements in the curriculum were prepared to cover the LGS exam, but some teachers stated that the textbook was not prepared in accordance with the LGS exam. In their research, Keskin and Yazar (2019) concluded that mathematics textbooks are insufficient, not interesting, not suitable for the student level and are not in the form to prepare the students for the university entrance exam. Fidelia and Inekwe (2019) concluded in their study evaluating the mathematics curriculum that a variety of well-equipped materials should be prepared for the effective implementation of the curriculum.

The criticized aspects of the curriculum are that the curriculum is not at a level to meet the specific objectives of mathematics, the constructivist approach is not included as much as necessary because some classes are crowded, some subjects in the content are included only once in secondary school and this is not in accordance with the principle of spiral learning, acquisitions such as identity that are not suitable for students' readiness are still included in the curriculum, the questions in the textbook and the EBA do not fully provide the quality of students to develop their skills such as correlating, reasoning, problem-solving, and giving less space to math problems in the curriculum. There are studies with similar results with these results of our study. In their study, Marshal and Herbert (1982) came to the conclusion that the teachers who applied the curriculum

followed the lesson plan in detail, described the lessons as compelling for the students and thought that the math classes had a more pleasant atmosphere. In their study examining the reasons of the high school students' failure in mathematics lesson, Kalhotra (2013) regards crowded classes as one of these reasons. In this respect, it supports the findings of our research. In their study, Keskin and Yazar (2019) determined that the students could not use the skills they gained during the lessons in daily life, and the teachers had problems with the implementation of the curriculum due to the crowded classes. In their research, Altındağ and Korkmaz (2019) determined that because the classes are crowded and teachers do practices for the exam system rather than paying attention to the program, they cannot implement the program properly. The results of our study contradicts with the result of Köse's (2011) study that the general skills specified in the curriculum are suitable to develop students at the desired level. The results obtained in the study of Köse "the methods, techniques and strategies specified in the curriculum are widely used by teachers, the textbooks are boring, the subjects are superficially covered in the textbook and the curriculum is compatible with the high school entrance exam" are similar to the results of our research.

Various implications were made according to the results obtained from the research and related literature.

- The curriculums in our country have been prepared by taking the constructivist approach to the center for many years. However, some of the teachers are still not qualified to use the constructivist approach in their lessons. In-service trainings can be organized to overcome this deficiency.
- Good teachers are the practitioners of a good curriculum. Practical lessons of preservice teachers in teacher training institutions can be reviewed.
- The crowded classes cause problems in the implementation of the curriculum. Crowded classes can be brought to the ideal class size by reviewing the possibilities.
- Necessary arrangements can be made for the subjects considered to be incompatible with the levels of 8th grade students and the acquisitions that center these subjects.
- In EBA and textbooks, activities to improve students' mathematics skills can be increased.
- More room for problem solving can be included in the curriculum.

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