Analysing of Geometry Questions in Secondary School Mathematics Books in Terms of Pisa Mathematics Proficiency *

Ortaokul Matematik Kitaplarindaki Geometri Sorularinin Pisa Matematik Yeterliliklerine Göre İncelenmesi

ÖZET

The aim of this study is to investigate the questions of Geometry and measurement-learning taking place in textbooks in terms of PISA mathematics proficiency, prepared for the academic year of 2020 and 2021, approved by the Board of Education and Discipline, taught to 7th and 8th grade students at secondary schools. This study investigates to what extent geometry questions in mathematics textbooks are concerned with the level of mathematics proficiency or competency. During the process of the books being examined, the questions were analyzed through PISA Mathematics Proficiency scale (MPC). In the study was used the document analyses technique, one of the qualitative research methods. Four books, each of which is a publication by the Ministry of National Education (MNE), 7th and 8th grade mathematics textbooks and mathematics applications textbook, were determined and 347 questions in the field of geometry and measurement learning were analyzed. The results obtained from the study indicated that 3rd level questions were found in 7th and 8th grade mathematics textbook, and 4th level questions in 7th and 8th grade mathematics applications textbook. It was concluded that the number of 2nd level proficiency questions in mathematics books and 3rd level competency questions in mathematics applications books is also higher. One other result of the research is that there are not enough questions at the 1st, 5th and 6th levels in the books examined. In this context, it may be beneficial to include the questions in the textbooks proportionally to all levels in parallel with the objectives of the curriculum.

Keywords: Mathematical Literacy, PISA Proficiency Levels, Mathematics Textbooks, Geometry

ABSTRACT

Bu çalışmanın amacı, 2020-2021 eğitim-öğretim yılına göre hazırlanmış, Talim ve Terbiye Kurulu tarafından kabul edilip ortaokullarda okutulan 7 ve 8. sınıfa ait matematik ve matematik uygulamaları ders kitaplarındaki geometri ve ölçme öğrenme alanına ait soruları, PISA matematik yeterlik düzeylerine göre incelemektir. Bu çalışma ile matematik kitaplarındaki geometri sorularının matematik yeterlik düzeylerini ne ölçüde içerdiği incelenmiştir. Kitapların incelenmesi sürecinde sorular PISA matematik yeterlik ölçeği ile analiz edilmiştir. Araştırmada, nitel araştırma yöntemlerinden biri olan doküman inceleme tekniği kullanılmıştır. Her biri MEB yayını olan 7 ve 8. sınıf matematik ders kitapları ve matematik uygulamaları ders kitabı olmak üzere dört kitap belirlenmiş ve 347 adet geometri ve ölçme öğrenme alanına ait soru analiz edilmiştir. Çalışmanın bulgularına göre 7 ve 8. sınıf matematik dersi kitabında 3. düzey, 7 ve 8. sınıf matematik uygulamaları ders kitabında ise 4. düzey soruların fazla olduğu tespit edilmiştir. Matematik kitaplarında 2. düzey, matematik uygulamaları kitaplarında 3. düzey yeterlikte soruların sayısının da fazla olduğu sonucuna varılmıştır. İncelenen kitaplarda 1, 5 ve 6. düzeyde soruların yeterince bulunmadığı ise araştırmanın bir diğer sonucudur. Bu kapsamda, ders kitaplarında bulunan soruların öğretim programının amaçlarına uygun olarak tüm düzeylere orantılı bir biçimde yer verilmesi faydalı olabilir.

Anahtar Kelimeler: Matematik Okuryazarlığı, PISA Yeterlik Düzeyleri, Matematik Dersi Kitapları, Geometri.

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INTRODUCTION

Since ancient times, changing living conditions and social phenomena have brought about many needs such as learning, production and development. One of the most important of these needs is the educational status of people (Özarslan, 2017). For this reason, it is necessary to update the education and training system in parallel with the future in order to increase the quality of education and training and make them more functional. However, with the developing technology, the fact that information is much easier and accessible from various sources and that many individuals today use this information without researching and assimilating the source of this information causes information pollution (Şaban, 2019; Karataş, 2019). Experts in the field of teaching should take into account the educational problems and prepare a teaching plan in order to increase the quality of education, while eliminating all

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kinds of educational problems, including technology and information pollution. Countries also develop education policies suitable for technology and aim to raise individuals who can create and apply knowledge and produce technology in line with these policies (Karataş, 2019). The PISA (International Student Achievement Examination) exam held in 2003 shows that some changes should be made in mathematics education in order for education to serve these purposes and to prepare them for real life.

Organization (OECD) has created the PISA project, which evaluates the mathematics, science and reading skills of students in the 15-year-old group (OECD, 2014). In the PISA exam; Various types of questions are used, such as open-ended, closed-ended, multiple choice, and complex multiple choice. PISA application focuses on whether students can reconstruct the knowledge and how much they can use the knowledge they have learned. The PISA application is a test that measures students' science, mathematics and literacy skills.

Although Turkey participated in this exam for the first time in 2003, the exam was first started to be applied in 2000. Turkey's PISA mathematics score showed a partial increase from 2003 to 2018 (Kaya, 2019; Kabael, 2021).

PISA defined mathematical literacy as the ability of individuals to formulate various contents, use and interpret mathematics. Mathematical literacy is measured in the PISA exam (Taşkın, 2017). PISA has identified six levels of mathematical literacy. According to the determined levels, the 1st level is the lowest and the 6th level is the highest (Şaban, 2019). Turkey remained at the 2nd level at the most and at the 6th level at the least in the scope of mathematical literacy in the PISA exam held in 2018 (Karadağ ve Karadağ, 2021).

Making use of educational tools in the education-teaching process contributes to the efficiency of education. In the 2023 Education Vision published by the Ministry of National Education, it was stated that learning materials should be compatible with the nature of students, and that students should not only be in a listening position, but also in an active position where they could satisfy their curiosity and make inquiries (MEB, 2018). Written materials used in education should be updated according to the objectives of the program and the purpose of teaching, and their efficiency on learning should be kept at a high level. Textbooks; It is expected to attract attention from the student's point of view, to contain many senses, to increase the motivation to learn, to make a meaningful connection with the past life of the student, to direct them to think, and to be up-to-date and understandable (Fidan, 2008). It is known that the use of textbooks in the classroom is high in developed and developing countries such as the United States and Japan (Hatay, 2020). Köksal (2021), who states that the addressees of the textbooks are the students, also thinks that the books used in teaching are concrete and important materials. Seis (2011) emphasized in his study that textbooks were one of the most important materials used in educational environments. Başer (2012) also mentioned that teachers' textbooks are an effective aid in following the lesson in his study in which he investigated the ways of using the textbooks and the effectiveness of the textbooks. Yang, Tseng and Wang (2017); He compared the books taught in Taiwan, Singapore, Finland and the United States in terms of the visuals, problem types, representation styles, and the way the content reflects the real world, and emphasized that mathematics textbooks are very effective on learning. The fact that the questions in the textbooks are not compatible with the subject, the visuals used in the questions are not related to the question or they have deficiencies in terms of completing the question, and the questions are far from their daily life situations is the main reasons for students' failure in the field of mathematics (Baltacı, 2021). The questions included in the textbooks recommended by the Board of Education and Discipline to be taught in schools should also be effective in teaching and meet the needs of the age. Considering the mathematics success in Turkey's PISA application, it is thought that the content in the mathematics textbooks should match the criteria of the questions in the PISA application. It is important to compare the questions found in the MEB mathematics textbooks used in schools about the learning field of geometry and measurement according to the PISA mathematics proficiency level. The problem statement of the research is "To what extent do the questions in the field of geometry and measurement learning in the 7th and 8th grade mathematics textbooks and mathematics applications textbooks taught in Turkey reflect the performance levels of the PISA mathematics proficiency scale?" has been determined.

Purpose of the research

The general purpose of this research is to determine at which level and how much it covers by categorizing the questions related to geometry and measurement in the mathematics textbooks and mathematics applications textbooks taught in 7th and 8th grades in Turkey at the PISA mathematics proficiency level.

Importance and Rationale of the Research

Considering the success level of Turkey in the PISA exams, where participation is provided according to the wishes of the countries, it is seen that there are fluctuations in mathematics achievement (Karadağ and Karadağ, 2021).

Textbooks prepared in line with specific objectives give information about the education system of all countries and show the culture of mathematics education (Karataş, 2019).

In the PISA exam, which is held every three years and attended by many countries around the world, the basic knowledge and skills of individuals about mathematics are measured. Mathematical literacy skills of students are also measured through the mathematics problems in the PISA exam. Jan De Lange, elements of mathematical literacy; examined under three headings as spatial literacy, numeracy literacy and quantitative literacy (Şaban, 2019). Spatial literacy, which is one of these elements, constitutes the objects, visual perception, dimensions of objects and the concept of distance, that is, the subjects of geometry and measurement learning area, with which the individual interacts with his environment from the moment he is born. Turkey's low success in the internationally organized PISA application draws the attention of researchers and shows us that there is a deficiency in the education and training program used in our country. The subjects and questions in school programs should be structured according to the needs of the individual and society. Mathematics curricula, materials used in teaching and textbooks should also meet this need. It is of great importance that the questions related to geometry and measurement learning in the 7th and 8th grade mathematics and mathematics applications textbooks taught in the 2020-2021 academic year reflect the levels in the PISA mathematics proficiency scale.

Count

In this study, in the examination of the geometry questions in the textbooks selected in line with the sample, according to the PISA mathematics proficiency scale t is thought that it will objectively reflect the opinions of the expert whose opinion was taken during the document review process.

Limitations

In this study, the selected books and the determined learning area were determined within the framework of some limitations.

1. Mathematics textbooks in this research consist of the books published by the Ministry of National Education of the 7th and 8th grades used in 2020-2021 academic year.

2. The spatial literacy area created by Jan De Lange according to the PISA mathematical literacy classification was limited to the geometry and measurement learning area, which includes the subject of space and shape.

3. The study is limited to a researcher and a field expert examining the questions.

METHOD

Model of the Research

The document analysis technique, which is a qualitative research method, was used in the research. Document analysis, which is used in fields that require qualitative study such as history and anthropology, is a research method that includes written materials containing information about the facts and phenomena that are aimed to be researched (Yıldırım and Şimşek, 2018). In this context, questions related to geometry and measurement learning in the 7th and 8th grade secondary school mathematics textbooks and mathematics applications textbooks taught in our country in 2020-2021 academic year were examined according to the PISA mathematics proficiency scale. First, the questions in the books were examined and coded, the levels of the coded questions were determined first, and then the results were drawn as a result of the documents obtained.

Selection of Textbooks

In Turkey, a total of four books have been determined for the research, one each for the 7th and 8th grades for 2020-2021 academic year, which is approved by the Board of Education and Discipline. Since the PISA application was applied to 15-year-old students, the books belonging to the 7th and 8th grades were selected in this study because their ages were close, and the questions related to geometry and measurement learning were examined in the mathematics books used in the study. All publications, including MEB publications, 7th grade mathematics textbook, 7th grade mathematics applications book, 8th grade mathematics textbook and 8th grade mathematics applications textbook constitute the sample of the research.

Data Collection

In this study, in which the geometry and measurement questions in the secondary school mathematics textbooks and mathematics applications textbooks were examined according to the PISA mathematics proficiency scale, the 7th grade mathematics textbook belonging to the 7th and 8th grades, all of which were published by the Ministry of Education, among the books recommended by the Board of Education and Discipline to be taught in secondary

schools, A total of four books, namely the 7th grade mathematics applications textbook, the 8th grade mathematics textbook, and the 8th grade mathematics application textbooks, were determined by the researcher.

Analysis Of Data

While collecting the data, first of all, questions related to geometry and measurement learning in the 7th and 8th grade mathematics course and mathematics applications textbooks taught in secondary schools were selected. The characteristics of six levels in the PISA mathematics proficiency scale were determined. The skills to be possessed for the solution of the selected geometry questions were noted. The questions were first coded by the researcher according to the PISA mathematics proficiency scale. It was then coded by another field expert based on the same scale. The two codings were largely similar, and the different codings were discussed with the field expert, and a consensus was reached and re-coded. While coding was done, the grade level, page number, order of the question on the page and mathematical proficiency level were determined. For example; Coding stating that the first question on page 42 of the 7th grade math applications book is at level 5; It was made in a 7-42-1-5 manner. Coding was applied in the same way for the 347 geometry and measurement questions in these books. Two explanations of sample questions on the analysis of questions are given below.

The questions of the geometry and measurement learning field in the 7th grade mathematics textbook in the study, in which the PISA mathematics proficiency scale was evaluated, an analysis of a selected question is given below.

The question in Figure 1.1, which is an example in the 7th grade mathematics textbook of the 2020-2021 academic year, is shown as the 1st level according to the mathematics proficiency level. The question given in Figure 1.1 is related to the acquisition of "Creates area relations of rhombus and trapezoid, solves related problems" and belongs to the field of learning geometry. In order to reach the solution of the problem, the student should have basic information such as knowing the rhombus and knowing what the concept of area is. The question given in the figure is to find the areas of the rhombuses on the square floor. A student who does not know the formula can reach the solution of the problem by counting the unit squares. The student can reach the result on unit squares, draw the diagonals of the shapes and determine their lengths, apply the area formula and reach the same result. The question was given clearly and did not contain any complex situations.
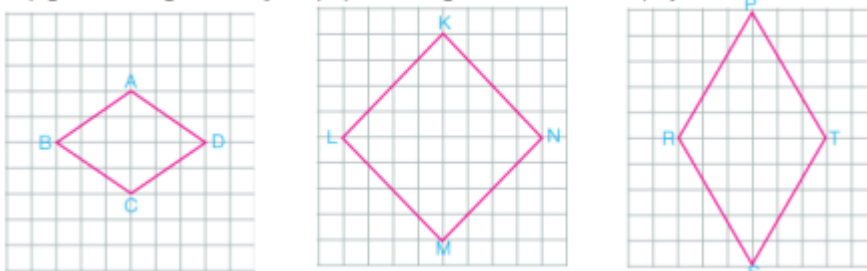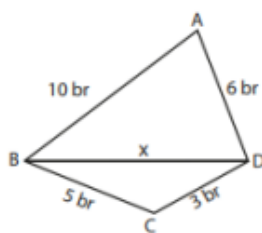

Figure 1.1. A Questionnaire Regarding the Learning Field of Geometry and Measurement in the 7th Grade Mathematics Textbook (Oğan and Öztürk, 2020)

The questions of the geometry and measurement learning field in the 8th grade mathematics textbook in the study, in which the PISA mathematics proficiency scale was evaluated, an analysis of a selected question is given below.

The question in Figure 1.2, which is an example in the 8th grade mathematics textbook of the 2020-2021 academic year, is shown as the 3rd level according to the mathematics proficiency level. The question in the figure is "Relates the sum or difference of the lengths of two sides of a triangle with the length of the third side." coincides with the gain. One edge in the method used to find the length of the common side in two common triangles, the length of the side not given is calculated separately for the two triangles, and two different intervals are found for the common side. Since some values found do not provide in the other triangle, it should be considered that the common values that satisfy both triangles will be taken. Based on this, it can be said that the problem requires sequential processing and requires the ability to interpret different situations. So the question reflects the 3rd level features.

Yandaki dörtgende x yerine yazılabilecek
tam sayı değerlerinin toplamını bulunuz.

Figure 1.2. The Question Regarding the Learning Field of Geometry and Measurement in the 8th Grade Mathematics Textbook Example (Çetin, Aksakal, Ertürk, Şay ve Tığlı, 2020)

Validity and Reliability of the Research

In academic studies, the study must be valid and reliable in order to make inferences as a result of the analyzes made in the study and to make the study defensible. In a qualitative study, it is desired to take measures to reach the truth and to increase reliability by evaluating the data of the study in a clear and detailed way by another researcher (Yıldırım & Şimşek, 2018). More than one coder is required to increase the validity in content analysis (Güler, Halıcıoğlu, & Taşğın, 2015). In this study, in order to increase the validity, the questions selected within the scope of the study were coded by a field expert and their opinions about the questions were taken. The degree of error-freeness of the values obtained from the measurement tool, that is, the similarity of the values coded by at least two field experts, constitutes the concept of reliability (Büyüköztürk, Çakmak, Akgün, Karadeniz, & Demirel, 2013). In this study, first of all, geometry questions were determined, then the questions were resolved and the skills to be possessed in solving the questions were determined according to the PISA mathematics proficiency scale. According to Miles and Huberman, the internal consistency of the coding should be at least 80% (Baltacı, 2017). The similarity of the coding made by the researcher and a field expert was found to be 89% using the formula Reliability = [Agreement / (Agreement + Disagreement)] x 100, and this value shows that the reliability of the study is high (Miles & Huberman, 1994). The questions that were coded differently were discussed with the field expert, and a consensus was reached and the questions were recoded.

FINDINGS

The problem statement of the study is "To what extent do the questions related to the geometry and measurement learning field of the 7th and 8th grade mathematics textbooks and mathematics applications textbooks taught in Turkey reflect the performance levels of the PISA mathematics proficiency scale?" The findings of the question are shown in Table 1. Table 1 shows the statistics of the geometry questions in the 7th and 8th grade mathematics textbooks and mathematics applications textbooks in secondary schools in Turkey in the 2020-2021 academic year, according to the PISA mathematics proficiency levels.

Table 1. Data on the Levels of Geometry Questions in Secondary School Books

Level / Books	1.level		2.level		3.level		4.level		5.level		6.level	
	N	%	N	%	N	%	N	%	N	%	N	%
7th grade math textbook	12	7	57	32	84	47	25	14	-	-	-	-
7th grade math practice book	3	9	5	16	10	31	12	38	2	6	-	-
8th grade math textbook	8	4	55	29	97	51	30	16	-	-	-	-
8th grade math practice book	-	-	4	9	12	26	21	45	9	19	1	2

In Table 1, the values showing the mathematics proficiency level of the number of questions in the field of geometry and measurement learning in the mathematics and mathematics applications books belonging to the 7th and 8th grades are given as the number and percentage of questions. It shows that among the 178 geometry questions in the 7th grade textbook, 7% of the first level, 32% of the 2nd level, 47% of the 3rd level, 14% of the 4th level, all of the questions contain medium and low level proficiency. In the 190 geometry questions in the 8th grade textbook; It consists of 4% 1st level, 29% 2nd level, 51% 3rd level, 16% 4th level proficiency. All of the geometry questions in the 8th grade textbook consist of intermediate and low-level questions, just like the 7th grade textbook. This is an indication that the distribution of questions in the 7th and 8th grade mathematics textbook according to levels is disproportionate and does not contain sufficient competence. 32 geometry questions in the 7th grade math applications book; 9% 1st level, 16% 2nd level, 31% 3rd level, 38% 4th level, 6% 5th level competency questions. Although there are high-level questions in this book, the fact that there are no questions at the 6th level and that the 5th level question is found in a very small amount at 6% shows us that the geometry questions in the books do not

contain high-level proficiency enough. 47 geometry questions in the 8th grade math applications book; There are 9% 2nd level, 26% 3rd level, 45% 4th level, 19% 5th level, 2% 6th level proficiency questions. In the 8th grade practice book, it was seen that the 1st level questions, which are the lowest proficiency, were not encountered, and the 6th level question, which was the highest proficiency level, was given very little space. As a result of the books examined, it was seen that the secondary school mathematics textbooks did not include high-level questions, and the high-level questions and low-level questions were not included in the mathematics practice books. The low number of high-level questions that contain the characteristics of more literacy proficiency is a proof that the spatial literacy skill, which is the subtitle of mathematical literacy, cannot be developed enough for students. According to the values in Table 1, it is seen that there are mostly 3rd level questions with a rate of 47% in the 7th grade mathematics textbook, 4th level with 38% in the 7th grade mathematics applications textbook, 3rd level with 51% in the 8th grade mathematics textbook, In the 8th grade mathematics applications book, the 4th level has the highest number of questions with 45%. In the 7th grade mathematics textbook, questions at the 5th and 6th levels could not be found, and we encounter the density in the 2nd and 3rd level questions. There were no questions at the 6th level in the 7th grade mathematics applications textbook, and it was seen that the number of questions at the 3rd and 4th levels was high. While no questions were observed at the 5th and 6th levels in the questions related to geometry and measurement learning in the 8th grade mathematics textbook, there were no 1st level questions in the 8th grade mathematics applications textbook. When the values in Table 1 are examined, it is seen that the distribution of questions is disproportionate and some levels are not encountered in the geometry questions in the books. Based on the statistics given in Table 1, it can be said that there are 3rd level questions in mathematics textbooks and 4th level questions in mathematics applications textbooks. This shows that while the questions in the mathematics applications textbook have higher level competency, it is clearly seen that the mathematics textbooks consist of lower level questions.

DISCUSSION AND CONCLUSION

In this study, it was investigated that the questions in the field of geometry and measurement learning in secondary school mathematics books were examined according to the PISA mathematics proficiency scale. The distribution of the mathematics and mathematics applications course books belonging to the secondary school according to the PISA mathematics proficiency levels was examined in line with the questions they contain, and they were discussed in terms of grade levels and book type. A total of 347 questions in the field of learning geometry and measurement in four books, two of which belong to the 7th grade and the other to the 8th grade, were examined. According to the results of the first sub-problem of the research, in the 178 questions belonging to the field of geometry and measurement learning in the 7th grade mathematics book; It was concluded that all of the questions, including 7% first level, 32% second level, 47% third level, and 14% fourth level, contain medium and low level proficiency. Öztürk (2020), who reached a similar result with this study in his study, stated that the mathematics questions in the LGS application applied in 2018 and 2019 consisted of questions with medium and low proficiency. The result of Seis's (2011) study, in which he examined the statistics questions in secondary school mathematics textbooks, is consistent with this study in terms of the concentration of the questions in the book at the 2nd and 3rd levels. The result of Baltacı's (2021) study examining questions related to geometry and measurement learning in mathematics books taught in Singapore and Turkey is that there are no high-level questions in the questions in the books taught in Turkey, and that there are only 2nd level questions at most. This study coincides with Baltacı's (2021) study in that there are no questions at the 5th and 6th levels in the geometry questions in the 7th grade mathematics textbook and the amount of low and medium level questions is high. In his study, Şaban (2019) examined the algebra questions in secondary school mathematics textbooks and found the rate of low-level questions to be 68%, the rate of medium-level questions to be 27% in the 7th grade mathematics book, and he encountered the conclusion that there were hardly any high-level questions. The result of Şaban (2019) is similar to the result of this study. A similar study in which the questions in the textbooks were examined according to the PISA mathematics proficiency levels is the study of Aydoğdu İskenderoğlu and Baki (2011) in which the questions in the 8th grade mathematics textbook were examined. Aydoğdu İskenderoğlu and Baki (2011) differ from the results of this study in that the questions were at the 2nd level at the most, and at the 3rd level in this study.

According to the results of the second sub-problem of the research, in a total of 32 geometry questions in the 7th grade mathematics applications textbook; There were 9% first level, 16% second level, 31% third level, 38% fourth level, 6% fifth level proficiency questions. While it was understood that these questions consisted of 4th and 3rd level questions, respectively, it was concluded that there were no 6th level questions. Şaban's (2019) study, in which he examined algebra questions in mathematics textbooks, is consistent with this study in the same way as in this study, in that high-level questions are not included in the mathematics applications textbook. According to the results of the third sub-problem of the research, 190 geometry questions in the 8th grade mathematics textbook; It was observed that 4% belonged to the first level, 29% to the second level, 51% to the third level, and 16% to the

fourth level. While it was concluded that these questions consisted of 3rd and 2nd level questions at most, respectively, 5th and 6th level questions were not encountered. The questions in the 8th grade mathematics textbook are at most level 3; The results of the studies of Aydoğdu İskenderoğlu and Baki (2011), Şaban (2019), Öztürk (2020) and Baltacı (2021) do not match due to their concentration at the 2nd level. However, as a result of the high number of 2nd and 3rd level questions in this study; Seis (2011) is similar to the results of Karataş (2019). Şirin (2019), on the other hand, examined the questions in the textbooks according to the PISA mathematics basic mathematics skill levels and found the most questions at level 0 and 1 in 6 skills. Since Şirin (2019) started the levels from 0 in his study, it is seen that the results of the studies do not overlap, since the levels found as a result of his study are at a low level. Another result of this study, the absence of questions at the 5th and 6th levels, shows parallelism with Şaban's (2019) study.

According to the results of the fourth sub-problem of the research, questions related to 47 geometry and measurement learning fields in the 8th grade mathematics applications course book; 9% second level, 26% third level, 45% fourth level, 19% fifth level, 2% sixth level proficiency. It was seen that these questions consisted of 4th and 3rd level questions at most, respectively. While it differs from the results of Seis (2011), Şaban (2019) and Öztürk's (2020) studies in terms of not having any questions at the 6th level in the mathematics applications textbook, Şaban (2019) The results of this study seem to agree with the results of this study.

When the results for the mathematics and mathematics applications course books were evaluated in general, it was encountered that the questions did not contain order according to the levels. Although the questions in the mathematics textbooks are at the 3rd level, it has been concluded that the 2nd level proficiency has a high number of questions, and the 5th and 6th level questions, which are high-level questions, are not included enough. This result is an indication that the questions in the books remain at medium and low proficiency. In the mathematics applications course books, it was seen that the questions were at the 3rd and 4th levels at most. In the questions in the mathematics applications book, the 5th level question was found more than in the mathematics books. The reason for this can be shown as the inclusion of questions adapted from PISA and TIMMS questions in mathematics applications books. It is seen as a positive feature of mathematics applications books that they include questions related to PISA and TIMMS applications. It is thought that the presence of such well-structured questions in the books will be effective in teaching in terms of structuring the knowledge of the students. In the reviewed books, the 6th level question does not appear in only one book. The fact that high-level questions were not included enough was seen as a deficiency in the books.

The fact that the question distribution in the secondary school mathematics textbooks examined in the research does not contain order can be shown as the reason for the low PISA exam results in Turkey. Mathematical literacy achievement scores of Turkey by years; 423 in 2003, 424 in 2006, 445 in 2009, 448 in 2012, 420 in 2015 and 454 in 2018. The results given lead to the conclusion that Turkey's mathematical literacy performance score is at level 2 proficiency. In this study, it was concluded that the questions in the books examined were concentrated at the 2nd and 3rd levels. This result shows that there may be a reason for our country's success in mathematics in the PISA exam.

The difference in the levels of mathematics books and mathematics applications books is striking as a result of the research. The fact that most of the questions in the mathematics applications books consist of the questions in the TIMMS and PISA applications may be the reason for the different levels of the questions in the mathematics books and mathematics applications books. It is thought that this is one of the reasons for the differences between these textbooks due to the objectives in the curriculum prepared by the MEB for the mathematics course and mathematics applications courses. It has been observed that the questions in the Mathematics Applications book are mostly created with a mathematical modeling approach, these questions contain mostly daily life problems, are created with a realistic attitude, include problem solving and posing situations, can be discussed with groups, and individuals' questions can be passed through different mental processes. However, in the mathematics textbook, it supports the result of the research in terms of the fact that the individual restructures the subject from the beginning, supports learning with a simple and plain expression, consists of questions that are expected to be solved with ordinary solutions, and consists of low and medium level questions.

Recommendatıons

Based on the findings of the research, it was observed that the geometry questions in the mathematics books were given a small number of questions that were considered high-level according to the PISA mathematics proficiency levels, and the questions were disproportionately included in the books. Turkey's low success in PISA application does not surprise us as a result of the findings of the research. Suggestions for the results of the research and suggestions for future research are as follows:

Recommendations for the Results of the Study

✓ In this study, within the scope of spatial literacy, that is, geometry learning area, which is the subtitle of mathematical literacy, 7th and 8th grade mathematics books were studied. Studying mathematics books taught in schools within the scope of numerical literacy and skill literacy, which is included in mathematical literacy, can contribute to the improvement of textbooks.

✓ As a result of our study, it was encountered that the 5th and 6th level proficiency questions, which are described as high-level, are rarely included in the textbooks, and it is thought that it would be beneficial to examine and rearrange the questions in the textbooks.

✓ The fact that 1st and 6th level questions are rarely encountered in the geometry questions in the mathematics applications books is another deficiency in the books. Although the questions in the books contain problems related to daily life, they should be included in a way that will support the students' work with concrete materials and contribute to their ability to interpret and produce ideas on the questions.

✓ Mathematics teachers can create questions that they use in the teaching process in a way that includes all levels. It is thought that the teaching process structured in this way will positively affect the relationship between teacher and student, and the quality of teaching will increase.

✓ The fact that the questions in the mathematics textbook contain the questions encountered in PISA applications in sufficient quantity will provide academic success to the students. It is recommended to include questions from applications such as PISA in textbooks.

Suggestions for Future Research

✓ In the literature review, the books that were examined as the subject of theses and articles were limited to the 8th grade because the PISA application was carried out with students in the 15-year-old group. In this context, since it is thought that it will be beneficial to bring mathematical literacy to students starting from the basic classes, the researches to be carried out can be extended to other grade levels.

✓ It is thought that researching the mathematics questions in the central exams applied to 8th grade students for entrance to high schools and the questions in the textbooks within the framework of mathematical literacy will contribute to the literature.

✓ The research was limited to two books each belonging to the 7th and 8th grades. Other books belonging to these grade levels can be studied, and research to be carried out with the opinions of teachers or experts can be supported by considering the PISA mathematics proficiency levels.

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