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Teachers' experiences, problems and solutions regarding special education and inclusive education in secondary school mathematics lessons: The case of Turkiye

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ABSTRACT

The aim of the research is to present the secondary school mathematics teachers' experiences regarding special education and inclusive education, determine the challenges and needs, find solutions through teachers, and describe the current situation, respectively. The phenomenological method was preferred in line with the stated aims. The participants of the study are eight secondary school mathematics teachers working in Elazığ province and they were included in the research by using the criterion sampling method, which is one of the purposeful sampling types. A semi-structured interview form consisting of 11 questions was used to collect data in the current study. The obtained data were analyzed using the descriptive analysis method. The mathematics teachers have limited knowledge about the general features of individuals with special needs in special education and inclusive education. The majority of the teachers did not receive on-the-job training for special education and inclusive education. It was identified that the mathematics teachers experience challenges due to students' features. Another result of the study showed that the mathematics teachers had the most difficulty in numbers and operations learning areas in special education and inclusive education. Mathematics teachers working at secondary schools should be informed about the general features of individuals with special needs and should be directed to on-the-job training on special education and inclusive education.

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1. Introduction

At the present time, mathematical literacy and teaching mathematics are important goals for the whole world (Pavlekovic, Kolar-Begovic and Kolar-Super, 2013). Mathematics is one of the fundamental courses at every grade level in primary, secondary schools or secondary education institutions in Türkiye. For this reason, it is imperative that we give importance to mathematics education and teaching in terms of gaining basic behaviors in mathematics. Teaching mathematics consists of research and knowledge in teaching and learning mathematics (Hacısalihoğlu, Mirasyedioğlu and Akpınar, 2004). The main aim of teaching mathematics is to enable the students to gain a variety of skills such as thinking, problem-solving, logical thinking, and association (Ministery of National Education [MoNE], 2018; National Council of Teacher of Mathematics [NCTM], 2000). Another aim is to enable the individual to gain mathematical thinking skills by developing their mathematical knowledge and skills (Yantır, 2007). Learning mathematics is a basic life skill (Organisation for Economic Co-operation and Development [OECD], 2016; Van de Walle, Karp and Bay-Williams, 2013). Learning mathematics and

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acquiring mathematical skills are also important in terms of contributing to the development of skills such as reasoning effectively, critical thinking or problem-solving. In this sense, mathematics teaching and learning should be carried out in a way and in an activity that will allow the development of the different skills mentioned (Altun, 2018).

Individuals should also have certain competencies in order to fulfill different responsibilities in their daily lives as a requirement of living in a community. These competencies are self-care, adaptation to communal living, or functional academic proficiencies. Functional academic proficiencies are different for each child's function and are used to perform daily living skills (Kırcaali-İftar, Ergenekon and Uysal, 2008). Proficiencies that are among functional academic proficiencies include reading and writing, telling the time, recognizing numbers, handling money or basic arithmetic operations (Kot, Sönmez, Yıkmış and Cora-İnce, 2016). Basic functional skills in mathematics are an important requirement for individuals to be able to act independently both in school and in daily life and to continue their daily lives. Learning mathematics and mathematical skills are critical in order for individuals to make sense of real life and successfully continue their lives and interpret the environment (Van de Walle et al., 2013). In addition, individuals should be literate in mathematics to be able to learn mathematical knowledge and skills covering the operational and conceptual knowledge (Soylu, Aydın, 2006). According to the MoNE (2018) learning mathematical concepts and operations is among the general aims of teaching mathematics at the primary and secondary school, and especially enabling the individual to gain basic mathematical skills as well as conceptual information is especially important in primary mathematics class. Secondary school mathematics teaching program (2018) consists of five basic learning areas such as numbers and operations, geometry and measuring, data processing, algebra, and probability. Sub-learning areas, subjects and learning outcomes differ according to class levels. Especially the basic acquisitions and subjects in the numbers and operations learning area is significant as a prerequisite for many skills that can be acquired in the future. In addition, deficiencies and challenges in the process of acquiring such basic skills create adversities for more complex skills (Al- Hmouz, 2018; Yusaini, Maat and Rosli, 2019).

1.1. Special Education and Inclusive Education

Special education includes educational services that are provided to individuals who differ significantly from average individuals, and that is individually planned and aimed at maximizing the individual's capacity to lead an independent life. Especially recently, the “individuals with special needs” is used for individuals who need special education. Among the individuals with special needs, there are gifted/talented individuals and individuals affected by disabilities (Kırcaali-İftar, 1998). Individuals requiring special education are generally grouped as gifted/talented, intellectual disabilities, learning difficulties, physical disabilities, speech and language impairments, hearing impairments, visual impairments and autism spectrum disorder.

Eripek (2005) describes special education as “All of the educational services that are individually planned, systematically implemented and carefully evaluated, aiming to maximize the possibility of individuals with special needs to live independently.” Regulation on Special Education Services of MoNE (2020) describes the aims of special education as follows:

Special training aims to enable the individuals requiring special education to

- Live independently as a requirement of one’s daily life,
- Live as self-sufficient individuals and,
- Receive education based on their educational needs, and to have a profession or a job.

Individuals with special needs have been being educated along with their peers in general education classes as inclusive education settings in Türkiye since the beginning of 1980s. Education needs and services targeted for individuals with special needs are included in law, decree law, regulations, directives and circulars. Decree Law No. 573 on Special Education dated 6/6/1997 puts forward inclusive education as “The training of individuals requiring Special Education that are carried out using

appropriate methods and techniques in schools and institutions of all types and levels together with their peers in accordance with the individual education plans prepared accordingly."

Similarly, inclusion is also defined as integration in the literature (Kırcaali-iftar, 1998; Kargın, 2004). On the other hand, MoNE (2020) used inclusion and integration together in the Regulation on Special Education Services, and that it is essential for schools to create an Individualized Education Program [IEP] development unit and to prepare IEP in mainstreaming education. Accordingly, the program includes the annual and short-term objectives of the program, the type and duration of the support education service to be provided, and how and by whom the service will be provided. In addition, it also includes techniques or methods to be used for teaching and evaluation, teaching materials, arrangements regarding the education environment, measures to prevent or minimize behavioral disorders (MoNE, 2020). It is important for individuals experiencing any different type of inadequacy to receive adapted education together with their peers in terms of the success of mainstreaming (Şafak, 2019). Determining the needs of individuals, differentiation in teaching methods and making feedback are necessary for effective inclusion and inclusiveness (Özmen, 2019). In particular, inclusiveness is important and necessary for the inclusion of individuals in society (Nunez, Rosares, 2021). Inclusiveness is also emphasized in terms of reaching all individuals and meeting the needs of all students studying in schools (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2017). In terms of mathematics education, teachers create learning environments that are appropriate for taking into account the needs of individuals and individual differences, learning environments, regulations, affective-cognitive or physical activities at different levels is important in inclusive education (Kuş, Gökbulut, 2021). In mathematics education research, it is necessary to support qualified and equally inclusive mathematics education and to include effective practices (Gervasoni, Peter-Koop, 2020).

1.2. Role of Teachers

Teachers are important elements for the implementation of inclusion/integration and special education services in education and the implementation of legal regulations, legislations and directives (Camcı-Erdoğan, 2021; Engelbrecht, Savolainen, 2018). The latest Regulation on Special Education Services of MoNE (2020) highlights teachers' roles in the classrooms so that individuals with special needs receive education in the same classes together with their peers, and the inclusive education to reach its goals. The role of teachers within the scope of special education has been researched and emphasized in the international literature (Engelbrecht, Savolainen, 2018; Geldenhuys, Wevers, 2013; Ketheeswaran, 2021; Paju, Räty, Pirttimaa and Kontu, 2016; Oswald, 2014; Walton, 2011). However, when the literature in Türkiye is reviewed, it is seen that mostly primary school teachers are included in studies and therefore their opinions and problems are examined in this context (Anılan, Kayacan, 2015; Babaoğlan, Yılmaz, 2010; Batmaz, Çermik, 2019; Bilen, 2007; Camadan, 2012; Çuhadar, 2006; Sadioğlu, Batu, Bilgin, 2012). Besides, there are studies putting forward the opinions of preschool teachers (Batu, Odluyurt, Alagözoğlu, Çattık, Şahin, 2017; Gök, Erbaş, 2011; Özaydın, Çolak, 2011), social studies teachers (Demirezen, Akhan, 2016), Turkish language teachers (Üçler, Yıkmış, 2021), mathematics teachers (Altıntaş, İlgün and Uygun, 2021; Hacısalihoğlu-Karadeniz, Akar and Şen, 2015; Kasap-Erdal, Yazgan-Sağ and Argün, 2022).) and science teachers (Denizli, 2015). The number of research studying the challenges and difficulties as well as determining the opinions and suggestions of the subject teachers working in secondary schools regarding the inclusion and special education practices is quite limited (Gün-Şahin, Gürbüz, 2016; Şekercioğlu, 2010). Therefore, determining the experiences, challenges and solution proposals of mathematics teachers working in secondary school and taking part in inclusive education and special education services constitutes the rationale of the research. Actually, it is extremely important for teachers to interpret and understand their own experiences and processes in contexts (Oswald, 2014).

Individuals with special needs continue to play an increasing role in general education classrooms, especially in mathematics learning processes. On the other hand, there are failures and shortcomings in the acquisition, use and generalization processes of these individuals in mathematics courses and basic concepts (Gürsel, 2019). Especially in mathematics lessons, mathematics teachers have important tasks

in terms of gaining important skills such as problem solving and performing basic arithmetic operations (Özkubat, Özmen, 2018). However, in contrast to this, secondary school mathematics teachers it is stated that their knowledge and experience in the field of inclusive education and inclusive classroom are insufficient (Kasap-Erdal et al., 2022).Considering the limited number of mathematics teaching studies in the education of individuals with special needs (Kuş, Gökbulut, 2021), the importance of studies conducted with mathematics teachers providing inclusive education stands out. As a matter of fact, the necessity of effective teaching in order to perform at the desired level in basic skills in the mathematics learning process of individuals with special needs comes to the fore (Gürsel, 2019). As emphasized in the field article, the role and perspectives of teachers in the context of inclusive education are very important (Aas, 2022; Nunez, Rosares, 2021).

1.3. Significance and Reason of the Research

Inclusive education is basically the process of adaptation of individuals who need special education to education in normal schools (Ataman, 2019). It is seen that there are limited number of studies on teaching mathematics in inclusive education (Kuş, Gökbulut, 2021). In the context of inclusive education and inclusiveness, teachers are expected to provide individuals who need special education with skills such as basic arithmetic operations and problem solving in the mathematics teaching process (Özkubat, Özmen, 2018). Especially the role of teachers in this process (Aas, 2022), perspectives, perceptions and attitudes are among the points that should be emphasized (Avramidis, Norwich, 2010; Nunez, Rosares, 2021). As a matter of fact, the success and efficiency of inclusive education depends not only on the ability of the individual with special needs, but also on the perceptions, attitudes and thoughts of the people involved in this education process (Avramidis, Norwich, 2010; Cawley, Hayden, Cade and Baker-Kroczynski, 2002). Based on all these reasons and important points, it was deemed necessary to conduct research on this subject. In this context the research is significant in terms of determining the experiences, challenges and solution proposals of mathematics teachers working in secondary school and taking part in inclusive education and special education services. Relevant partners may benefit positively from presenting the current situation with the experiences and accomplishments of the teachers. Addressing the challenges, difficulties or deficiencies by the teachers and offering solutions will undoubtedly contribute to the literature and to the field of practice.

1.4. Aim of the Research and Research Questions

The aims of the current research are presenting the current situation with the experiences and accomplishments of the teachers, determining the challenges and needs, finding solutions through teachers, and describing the current situation, respectively. The general research question is "What are the experiences, challenges and solution suggestions of teachers working in secondary school mathematics classes regarding special education and inclusive education?". Answers were sought for the following research questions in line with this general problem:

1. What are the experiences of mathematics teachers working in secondary school mathematics classes regarding special education and inclusive education?
2. What are the challenges of mathematics teachers working in secondary school mathematics classes regarding special education and inclusive education?
3. What are the solutions and suggestions of mathematics teachers working in secondary school mathematics classes regarding special education and inclusive education?

2. Method

The current research was designed and conducted as a qualitative research. The research aimed to present the current situation with the experiences and lives of the teachers, determine the challenges and needs, find solutions through teachers, and describe the current situation. Phenomenology method was preferred in line with the above-mentioned aims. The aim of phenomenology studies is to interpret individuals' experiences, determine their perception, perspectives, thoughts or feelings (Creswell, 2020;

Patton, 2018; Wilson, 2015). Teachers' experiences, thoughts, understanding and perspectives are handled with an inductive approach (Yıldırım, Şimşek, 2016) in line with this aim.

2. 1. Participants

The research participants are eight secondary school mathematics teachers working in Elazığ province and they were included in the research using the criterion sampling method, which is one of the purposive sampling types. The criteria sought in the selection of teachers are that they are mathematics teachers working in secondary schools and that they have been practicing inclusive education. Particularly in the context of phenomenological design, it is essential to select participants who have lived and experienced the researched phenomenon. Table 1 presents the distribution of the participant group according to various variables.

Table 1. Distribution of the participant group according to various variables

Teacher	Gender	Professional Seniority	Highest Degree	Status of taking any course related to special education during undergraduate education
T1	Female	1-5 years	Bachelor's Degree	No
T2	Female	6-10 years	Master's Degree	No
T3	Male	6-10 years	Bachelor's Degree	No
T4	Male	1-5 years	Bachelor's Degree	Yes
T5	Female	6-10 years	Bachelor's Degree	No
T6	Female	11-15 years	Master's Degree	No
T7	Female	6-10 years	Bachelor's Degree	Yes
T8	Male	16 years or more	Bachelor's Degree	No

When Table 1 is examined, it can be seen that three of the eight teachers participating in the research are male and five are female. Two of the participating teachers have a professional seniority of 1-5 years, four of them 6-10 years, one of them 11-15 years, and one of them 16 years or more. In addition, two of the teachers have bachelor's degrees, and six of them have master's degrees. Two of the teachers who took a course related to special education during undergraduate education. Most of the teachers did not take any lessons related to special education during their undergraduate education.

2. 2. Data Collection

In the current study, a semi-structured interview form consisting of eight questions was used in the data collection, apart from three questions including personal information of the participants (gender, professional seniority, type of degree). First of all, a voluntary consent form was taken from the participants and necessary information about the purpose and scope of the study was given. To enable the participants to provide voluntary and sincere answers to the questions, the interview time was kept flexible, the shortest interview lasted 7 minutes 20 seconds, the longest interview lasted 16 minutes 4 seconds. While developing the data collection tool, firstly, the literature was reviewed and a total of 11 questions were formed and presented to an academician who is an expert in mathematics education to ensure content validity and internal validity. The final form was developed by making necessary arrangements in line with the opinions of a Turkish teacher in terms of reading and style.

1) Did you take specialized classes regarding special education during your undergraduate education?
2) What do you know about students in inclusive education and their general features? Please explain.
3) How and in what ways can you relate special education and mathematics courses? Please explain.
4) Did you receive any on-the-job training regarding special or inclusive education?
5) Do you think it is a difficult experience to teach while having inclusive students in mathematics class? Please explain.
6) What kind of deficiencies or challenges do you think there are about special education and inclusive education in mathematics class? Please explain.
7) In which learning area do you have the most problems in math class? Could you explain why?
8) What are your suggestions, requests and expectations in terms of realizing a healthy inclusive education in mathematics lessons as well as contributing to special education? Please explain.

2. 3. Interpreting Data

The data were analyzed using descriptive data analysis. Qualitative data were presented and interpreted by using categories and codes in accordance with figure graphics and with participant opinions. Descriptive analysis is a method that examines and interprets priorly collected data based on a predetermined framework. The aim is to have a systematic description of data analysis in line with the findings (Yıldırım, Şimşek, 2016). Semi-structured interview forms were numerized as Teacher (T)1, T2, T3 in the data analysis phase of the research. Next, all the data were collected and organized under the titles of the experiences, challenges and solution suggestions of mathematics teachers working in secondary schools regarding special education and inclusive education.

2. 4. Validity and Reliability

The concepts of validity and reliability can be found as transferability, consistency, credibility and confirmability in qualitative research (Yıldırım, Şimşek, 2016). In the study, the answers of the participants were presented using the direct quote strategy to ensure validity and reliability. The research is specified with all its dimensions and processes. In addition, researcher's role was described to prevent the elements that could pose a threat to validity by recording audio, using direct quotations, preferring purposive sampling, and identifying the researcher. Two randomly selected interview transcripts were analyzed by another expert other than the researcher to ensure the reliability of the research. As a result of the analysis, the consensus percentage of Miles and Huberman (1994) was found to be 86%. It can be said that the results of the research are reliable since this value is over 70%.

2. 5. Role of the Researcher

The researcher who planned and conducted the research is a secondary school mathematics teacher in a public school in Türkiye. The researcher, who has over eight year's professional experience, continues her PhD studies in the department of teaching mathematics. In addition, during her teaching experience, the researcher provided special education services and applied supportive education to students in inclusive education at various grade levels, different ages and disability types. She decided to do such a study based on her own challenges and experiences. She conducted the research process in an impartial and transparent manner. In the process, she stayed away from all kinds of prejudices, emotions and influence elements. She complied with all ethical rules that must be followed during a scientific research process.

3. Findings

The data obtained in the research are presented in the findings section separately under the titles of the experiences, challenges and solution suggestions of mathematics teachers working in secondary schools regarding special education and inclusive education. While presenting the findings, graphs, tables, frequency values and the researchers' own expressions were used. There are three themes in the research: experiences regarding special education and inclusive education, challenges regarding special education and inclusive education and teachers' suggestions for special education and inclusive education. Within the scope of the themes, there are deficiencies and challenges, receiving on-the-job training, experience, learning areas and suggestion categories. Codes related to categories are has been presented to the reader in tables and figures. Participant answers has been transferred for each code.

3.1. Experiences Regarding Special Education and Inclusive Education

The secondary school mathematics teachers' current knowledge about students and their general features in inclusive education was determined based on the experiences of teachers working in secondary school mathematics classes on special education and inclusive education. The answers given by the teachers to "What do you know about students in inclusive education and their general features? Please explain" are given below.

T1: They need special education.
T2: We are doing a job that needs effort and patience.

T3: They are the group of students who are disadvantaged and need the most attention.

T4: In general, they have a report about their disabilities. They are included in individualized education programs (IEP) and their exams are at elementary levels.

T5: I do not know much.

T6: Individualized education programs are developed for students in inclusive education by considering the learning outcomes. These are the students that may differ from their peers regarding their physical appearance, and sometimes they have behavioral problems. They may experience challenges in adapting to lessons and the communication with peers may be a problem in classes.

T7: They need special education and care. A rich learning environment should be established in class. They are individuals who learn slower and less than their peers.

T8: Students in special education generally have a physical or cognitive deficiency. They learn in a different way than others and you need to be patient.

When the participants' answers are examined, it can be seen that they have limited information about special education and inclusive training, and some participants do not know anything. In addition, the answers show that the general features of the individuals with special education needs are most likely to be known, and IEP and in-class elements are mentioned. The answers of secondary school mathematics teachers to "How and in what ways can you relate special education and mathematics courses? Please explain" based on the experiences of mathematics teachers regarding special education and inclusive education are presented below.

T1: They are both vital.

T2: Our inclusive students in inclusive education with individualized education plans require special education and need to learn mathematics, at least the basic operations.

T3: There is not a relation, they just need to know mathematics.

T4: Like every student, students in special education also have difficulties in mathematics lessons.

T5: There is surely a relationship.

T6: Mathematics lessons are the most difficult part of special education. We need to keep the best interest of students in mind while teaching the basic concepts.

T7: A rich learning environment should be created in mathematics lessons for students who need special education. Mathematics is a vital and important lesson for individuals who need special education.

T8: The knowledge and skills required for all students in the mathematics lessons are also necessary in terms of special education. There can be special students in each class. Mathematics is an important subject for them as well.

When the participants' answers are considered, it can be seen that they closely associate special education and mathematics class, and that the participants stated that teaching mathematics is one of the hardest parts of special education. Figure 1 presents information on whether the mathematics teachers working in secondary schools have received any on-the-job training related to special education or inclusive education, which is a part of their experience in special education and inclusive education.

Figure 1: Receiving on-the-job training

As it can be seen from Figure 1, f=5 (62.5%) of the teachers answered no by stating that they did not receive any on-the-job training regarding special education or inclusive education, and f=3 (37.5%) answered yes by stating that they received on-the-job training.

3.2. Challenges regarding special education and inclusive education

The challenges faced by mathematics teachers working in secondary schools regarding special education and inclusive education were first determined by considering whether they had difficulties while teaching inclusive students in mathematics classes. Figure 2 presents teachers' answers.

Figure 2: Experience

As it can be seen from Figure 2, f=7 (87.5%) of the teachers answered yes by stating that teaching while having students in inclusive education is a challenging experience, and f=1 (12.5%) of the teachers stated that it is partially difficult. Table 2 presents the answers given by mathematics teachers working in secondary schools "What kind of deficiencies or challenges do you think there are about special education and inclusive education in mathematics class?"

Table 2. Distribution of deficiencies or problems related to special education and inclusive education in mathematics lesson

Deficiencies and Challenges	Frequency (f)	Teacher
Deficiencies and challenges caused by student features	2	T4 and T7
Pedagogical deficiencies and problems	2	T8 and T2
Technological deficiencies and problems	1	T1
Deficiencies and problems originating from different education stakeholders (Parents, administrators, etc.)	1	T6
Deficiencies and problems related to the subject area	1	T3
Deficiencies and problems arising from physical conditions and environment	1	T7
Deficiencies and problems due to lack of knowledge	1	T5

As it can be seen from Table 2, f=2 of the teachers stated that they experience pedagogical deficiencies and problems, f=2 stated that they experience deficiencies and problems caused by student features. Other teachers stated that they experience technological deficiencies and problems (f=1), deficiencies and problems related to the subject area (f=1), deficiencies and problems caused by physical conditions and environment (f=1), and deficiencies caused by different education stakeholders (parents, administrators, etc.). F=1 teacher stated that they experience problems due to lack of knowledge. Figure 3 presents answers of mathematics teachers working in secondary schools to "In which learning area do you have the most problems in math class?" regarding special education and inclusive education.

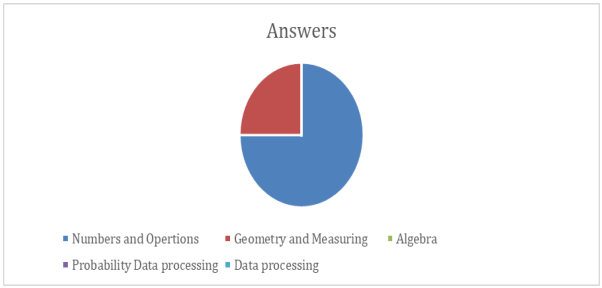

Figure 3: Learning areas

As it can be seen from Figure 3, f=6 (75%) of the teachers stated that they have the most problems in numbers and operations learning area, and f=2 (25%) in geometry and measuring. As it can be inferred from the Figure, none of the participants stated algebra, probability and data processing as problematic areas. The reasons for the answers given by the mathematics teachers working in the secondary schools regarding the learning area in which they have the most problems in special education and inclusive education are given below.

T1: Because numbers and operations learning area is the most fundamental one and there are many learning outcomes.

T2: Geometry and measuring because abstract thinking and drawing are difficult.

T3: Numbers and operations because learning division and multiplication is difficult for them.

T4: Numbers and operations.

T5: They are not responsible for the other learning outcomes, but the numbers are already difficult for them.

T6: Most of the learning outcomes are in this learning field, anyways.

T7: Numbers and operations, because the learning fields and learning outcomes are numerous. These are vital subjects. They are intertwined and important in real life.

T8: Geometry and measuring are difficult learning fields since they require drawing and students find these subjects abstract.

3.3. Teachers' suggestions for special education and inclusive education

The answers given by secondary school mathematics teachers working in special education and inclusive education to the "What are your suggestions, requests and expectations in terms of realizing a healthy inclusive education in mathematics lessons as well as contributing to special education? Please explain." are below.

T1: Teachers should be supported.

T2: I did not receive the necessary training on these issues, but I would like to. We do not know the necessary methods to help them.

T3: Education should be provided in a sincere way by communicating with schools and teachers. We need classes and educational teaching aids, at least.

T4: Mathematics teachers and special education teachers should collaborate to identify and solve the problems.

T5: It is necessary to be trained.

T6: On-the-job training can be provided. Teachers can be supported in terms of having access to resources. Each school should have a guidance counselor. There aren't any mathematics resources in special education. This is a shortcoming. Mathematics lacks source books for special education. The students can be supported in terms of technological tools. The teachers should receive training.

T7: Teachers should have on-the-job training regarding special education. They should be supported in terms of materials and environment. Parents and school administrators should be informed. Mathematics classes should be enriched with technological tools because the teachers are having problems about teaching methods. They do not know the basics about these students and cannot decide how to approach them.

T8: The mathematics teachers should be informed about special education in university. They should be supported in terms of providing a suitable environment, having source books, and methods. Teachers are really having problems during mathematics lessons. Special education syllabuses should include more information and learning outcomes about special education. Students should have source books. Awareness of principals, parents and students should be raised.

4. Conclusion and Discussion

The results obtained from the research as a result of the findings are as follows: The mathematics teachers have limited information about special education and inclusive education, especially the general features of individuals with special needs are not known enough. Teachers think that

mathematics is important and needed in special education and inclusive education, and that these two are inter-connected. The majority of the teachers did not receive any on-the-job training about special education and inclusive education. The results show that the secondary school mathematics teachers highlighted that teaching while having inclusive education students in class is difficult, and that they have problems in many areas. In this regard, teachers are having problems due to students' special needs and experience problems due to pedagogical deficiencies and problems. Another result of the study shows that mathematics teachers have the most difficulties in numbers and operations learning fields in special education and inclusive education. Teachers stated that the intensity of the subject and its scope is causing these problems.

The results of the research reveal that the knowledge of mathematics teachers about special education and inclusive education, especially about the general features of individuals with special needs, is at a limited level, and this result is similar to the results obtained in many other studies. Rakap and Kaczmarek (2010), as a finding that teachers experience difficulties in inclusive education, revealed that there are necessary knowledge and skill deficiencies in the teaching of individuals with special needs. This conclusion was also expressed by teachers in the current research. Camcı-Erdoğan (2021) concluded that it is important for subject teachers who are not working on special education to have knowledge at both primary and secondary school levels, and this result is consistent with the research conducted. Yılmaz and Batu (2016) concluded that in general, teachers lack information about inclusive education, and that they are not trained enough, and these results are consistent with the current research. Gün-Şahin and Gürbüz (2016) concluded that different subject teachers in inclusive education do not consider themselves sufficient about inclusive education and have some wrong information, and these are in line with the research conducted. In addition, there are studies in the literature that support this research by showing that the teachers should be informed about special education and inclusive education or the features and teaching practices of individuals with special needs (Demir, Açar, 2011). In their research, Nunez and Rosares (2021) emphasized the importance of inclusive education in involving individuals in society and came to the conclusion that teachers are not fully equipped in this regard and that they are forced in the process.

Another result obtained from the research, the fact that most of the mathematics teachers did not receive any on-the-job training on special education and inclusive education, is consistent with the results obtained in different studies. Babaoğlan and Yılmaz (2010) showed in their research conducted with classroom teachers that teachers did not receive any on-the-job training. Özaydın and Çolak (2011) concluded in their study that on-the-job training for preschool teachers on special education and inclusive education should be organized and teachers should participate in training. This result is similar to the results obtained from the present study. In addition, in the Aas (2022) research, he has been emphasized the need for teachers to be encouraged and supported in the context of inclusive education. In the study conducted by Rakap and Kaczmarek (2010), teachers who take courses related to special education at the university and receive in-service education have a more positive attitude towards mainstreaming. In this context, the findings obtained in our research are supported.

The result, which shows that the secondary school mathematics teachers emphasizing that teaching while having inclusive education students in the mathematics lesson is a difficult experience and that they had problems in many subjects, is in line with the relevant literature. In this context, it is another result that mathematics teachers mostly experience deficiencies and problems due to student features and pedagogical deficiencies and problems. In fact, the stated results are supported by the results of the research conducted by Anılan and Kayacan (2015), with the results that the teachers did not receive a planned pedagogical training and that they have difficulties in terms of controlling student behaviors, and teaching and management skills in special education. In addition, the lack of special education courses in teacher training programs and the fact that teachers graduating without having necessary knowledge (Gün-Şahin, Gürbüz, 2016; Kargın, 2004), which is expressed in many studies in the literature, may be the reason for the problems of the teachers due to pedagogy and student features. The current research puts forward such a conclusion. Especially Avramidis and Norwich (2010) study,

teachers ' positive attitudes towards individuals who are in need of special needs and inclusive education, student characteristics have revealed the importance of knowledge and positive attitude. All these important aspects are similar to the results obtained from our research.

4.1. Suggestion and Limitations

Several suggestions can be made in line with the results obtained. Secondary school mathematics teachers should be trained about the general features of individuals with special needs in special education and inclusive education. In this context, mathematics teachers should have on-the-job training about special education and inclusive education. Workshops at the central and provincial levels can be organized. The difficulties and problems experienced by secondary school mathematics teachers teaching while having inclusive students in mathematics lessons should be determined on a regional or class basis. The present research was conducted in a qualitative design with a small number of participants and in the context of Turkiye for secondary school mathematics teachers. This is one of the limitations of the research and does not provide the opportunity to generalize the results. As a matter of fact, the limitations mentioned can be eliminated by conducting studies that include quantitative or mixed methods with more participants. In the context of different countries, research within the scope of different field and subject teachers can be designed in the future.

References

Aas, H. K. (2022) Teachers talk on student needs: exploring how teacher beliefs challenge inclusive education in a Norwegian context. *International Journal of Inclusive Education*, 26(5), 495-509. DOI: 10.1080/13603116.2019.1698065

Al-Hmouz, H. (2018). The effectiveness of the touch math program in teaching addition to students with math disability. *Jordan Journal of Educational Sciences,* 14(4), 461-474.

Altıntaş, E., İlgün, Ş., & Uygun, S. (2021). Opınıons of elementary school mathematıcs teachers on specıal educatıon lesson and mathematıcs educatıon through ınclusıon. *Uşak University Journal of Educational Sciences* , 7 (3), 21-38. DOI: 10.29065/usakead.1020053

Altun, M. (2018). *Ortaokullarda matematik öğretimi*. (13.baskı). Aktüel Alfa Akademi Yayıncılık.

Anılan, H. & Kayacan, G. (2015). The reality of inclusive education through classroom teachers. *Bartın University Journal of Faculty of Education,* Özel Sayı, 74-90. DOI: 10.14686/BUEFAD.2015USOSOzelsayi13199

Avramidis, E. & Norwich, B. (2002) Teachers' attitudes towards integration / inclusion: a review of the literatüre. *European Journal of Special Needs Education*, 17(2), 129-147. DOI: 10.1080/08856250210129056

Ataman, A. (2019). "Özel eğitimin temelleri (Ayşegül Ataman, ed.)" *Temel eğitim öğretmenleri için kaynaştırma uygulamaları ve özel eğitim* (5. Baskı), Vize Yayıncılık, Ankara.Babaoğlan, E. & Yılmaz, Ş. (2010). Competency of classroom teachers in the inclusive education. *Kastamonu Education Journal*, 8(2), 345-354.

Batmaz, G. & Çermik, H. (2019). The obstacles and support experienced by primary school teachers in the ınstructional arrangements made for ınclusion students. *Journal of Educational Theory and Practice Research,* 5(1), 27-38.

Batu, E. S., Odluyurt, S., Alagözoğlu, E., Çattık, M., & Şahin, S. (2017). Determining the opinions of preschool teachers regarding inclusion. *Ankara University Faculty of Educational Sciences Journal of Special Education*, 18(3), 401-420. DOI: 10.21565/ozelegitimdergisi.283374

Bilen, E. (2007). *Primary school teacher's opinions about the problems they are facing during the integration activities and their solution proposals.* (Unpublished Master Thesis), Dokuz Eylül University, Institute of Education Sciences, İzmir.

Camadan, F. (2012). Determining primary school teachers' and primary school preservice teachers' self-efficacy beliefs towards integrated education and IEP preparation. *Electronic Journal of Social Sciences*, 11(39), 128-138.

Camcı-Erdoğan, S. (2021). Opinions of pre-service teachers about the education of individuals with special needs. *Ankara University Faculty of Educational Sciences Journal of Special Education*, 22 (2), 283-306. DOI: 10.21565/ozelegitimdergisi.663271.

Cawley, J., Hayden, S., Cade, E., & Baker-Kroczynski, S. (2002). Including students with disabilities into the general education science classroom. *Exceptional Children, 68*(4), 423–435. DOI:10.1177/001440290206800401

Creswell, J. W. (2020). *Nitel araştırma yöntemleri: Beş yaklaşıma göre nitel araştırma ve araştırma deseni,* (Çev. Ed: Bütün, M. & Demir, S.B.). 5. Baskı, Ankara: Siyasal Kitabevi.

Çuhadar, Y. (2006). *Determining the views of the form masters and the principals concerning the preparation, implementation, monitoring and evaluation of the IEP for the students that are subject to coalescence education in classes 1-5 of elementary education*. (Unpublished Master Thesis), Zonguldak Karaelmas University, Institute of Social Sciences, Zonguldak.

Engelbrecht, P. & Savolainen, H. (2018). A mixed-methods approach to developing an understanding of teachers' attitudes and their enactment of inclusive education. *European Journal of Special Needs Education,* 33(5), 660-676. DOI:10.1080/08856257.2017.1410327

Eripek, S. (2005). *Zekâ geriliği*. Ankara. Kök Yayıncılık.

Demir, M. K. & Açar, S. (2011). Experienced classroom teachers' opinions on inclusive education. *Kastamonu Education Journal*, 19(3), 719-732.

Demirezen, S. & Akhan, N. E. (2016). The opinions of the social studies teachers on inclusion practices. *Abant Izzet Baysal University Journal of Faculty of Education,* 16(USBES Özel Sayı II), 1206-1223.

Denizli, H. (2015). *Opinions and suggestions of science class teachers and students with disabilities taking science class on the application process of inclusion practices*. (Unpublished Master Thesis), Giresun University, Institute of Sciences, Giresun.

Geldenhuys, J. L. & Wevers, N. E. J. (2013). Ecological aspects influencing the implementation of inclusive education in mainstream primary schools in the Eastern Cape, South Africa. *South African Journal of Education*, *33*(3), 1–18.

Gervasoni, A., & Peter-Koop, A. (2020). Inclusive mathematics education. *Mathematics Education Research Journal*. 32, 1–4. DOI: 10.1007/s13394-020-00315-0

Gök, G. & Erbaş, D. (2011). Early childhood teachers' opinions about and suggestions for inclusion programs. *International Journal of Early Childhood Special Education*, 3(1), 66-87.

Gün-Şahin, Z. & Gürbüz, R. (2016). On The Proficiency of Secondary Teachers Educating Inclusive Students. *Adıyaman University Journal of Educational Sciences*, 6(1), 138-160.

Gürsel, O. (2019). "Matematik öğretiminde öğrenme alanları ve temel beceriler" (Oğuz Gürsel, ed.) *Özel gereksinimli öğrencilere matematik beceri ve kavramlarının öğretimini planlama ve uygulama* (3. Baskı), Vize Yayıncılık, Anakara.

Hacısalihoğlu, H. H., Mirasyedioğlu, Ş., & Akpınar, A. (2004). *Matematik öğretimi*.(1. baskı). Ankara: Asil Yayın Dağıtım.

Hacısalihoğlu-Karadeniz, M., Şen, H., & Akar, Ü. (2015). Reflections from the process of maths applications in inclusive education. *Milli Eğitim Dergisi*, 45(207), 169-188.

Kargın, T. (2004). Kaynaştırma: Tanımı, gelişimi ve ilkeleri. *Ankara University Faculty of Educational Sciences Journal of Special Education*, 5(2), 1-13.

Kasap-Erdal, D., Yazgan-Sağ, G., & Argün, Z. (2022). Examination of teaching practices in inclusive classrooms: The case of middle school mathematics teachers. *Ankara University Faculty of Educational Sciences Journal of Special Education*, Onlıne Fırst. DOI:10.21565/ozelegitimdergisi.947139

Ketheeswaran, K. (2021). Supporting the special education unit system in promoting inclusive education. *European Journal of Special Education Research*, 7(3), 17-35. DOI:10.46827/ejse.v7i3.3869

Kırcaali-İftar, G. (1998). *Kaynaştırma ve destek özel eğitim hizmetleri*. S. Eripek (Editör): Özel Eğitim, (s.17-22). Eskişehir: Anadolu Üniversitesi Yayınları.

Kırcaali-İftar, G., Ergenekon, Y. & Uysal, A. (2008). Teaching addition and subtruction via constant time delay procedure to a student with intellectual disabilities. *Anadolu University Journal of Social Sciences*, 8(1), 309- 320.

Kot, M., Sönmez, S., Yıkmış, A., & Cora-İnce, N. (2016). The effectiveness of the touch math technique to teach in-hand addition to students with hearing impaire. *Current Research in Education*, *2*(1), 17-28.

Kuş, S. & Gökbulut, Y. (2021). Teacher opinions on mainstream and mathematics teaching. *Turkish Scientific Researches Journal.* 6 (2), 345-358.

Ministry of National Education. (2018). *Mathematics curriculum (Primary and middle school 1, 2, 3, 4, 5, 6, 7 and 8th grades).* Ankara. Retrieved 04.03.2021 from https://ttkb.meb.gov.tr/.

Ministery of National Education. (2020). *Özel eğitim hizmetleri yönetmeliği.* Erişim Tarihi:02/02/2022.

Miles, M., & B. Huberman, A. M. (1994). *Qualitative dataanalysis: An expanded sourcebook*. (2nd edition). Calif: Sage Publications.

NCTM (2000). *Principles and standards for school mathematics.* Reston, VA: Author.

Nunez, R. & Rosales, S. (2021). Inclusive Education: Perceptions and attitudes among Filipino high school teachers. *The Asian ESP*, 17(6.1), 151-172.

OECD. (2016). *PISA 2015 Results: Excellence and Equity in Education (Volume 1).* Paris: OECD Publishing.

Oswald, M. (2014). Positioning the ındividual teacher in school-based learning for ınclusion. *Teaching and Teacher Education*, 37, 1–10.

Özaydın, L. & Çolak, A. (2011). The views of preschool education teachers over mainstreaming education and over in-service education program of mainstreaming education at preschool education. *Kalem Eğitim ve İnsan Bilimleri Dergisi,* 1(1), 189-226.

Özkubat, U., & Özmen, E. R. (2018). Analysis of mathematical problem solving process of students with learning disability: Implementation of think aloud protocol. *Ankara University Faculty of Educational Sciences Journal of Special Education*, 19(1), 155-180. DOI: 10.21565/ozelegitimdergisi.299494

Özmen, E. R. (2019). "Öğretim ilkeleri ve öğretimsel uyarlamalar" (Ayşegül Ataman, ed.) *Temel eğitim öğretmenleri için kaynaştırma uygulamaları ve özel eğitim* (5. Baskı), Vize Yayıncılık, Ankara.

Paju, B., Räty, L., Pirttimaa, R., & Kontu, E. (2016). The school staff's perception of their ability to teach special educational needs pupils in ınclusive settings in Finland. *International Journal of Inclusive Education*, 20(8), 801–815.

Patton, M. Q. (2018). *Nitel araştırma ve değerlendirme yöntemleri*, (Çeviri Ed: Bütün, M. & Demir, S.B.). 2. Baskı, Ankara: Pegem Akademi.

Pavleković, M., Kolar-Begović, Z., & Kolar-Šuper, R. (2013). *Mathematics teaching for the future*. Josip Juraj Strossmayer University of Osijek Faculty of Teacher Education and Department of Mathematics, Zagreb.

Rakap, S. & Kaczmarek, L. (2010). Teachers' attitudes towards inclusion in Turkey. *European Journal of Special Needs Education*. 25(1), 59-75. DOI: 10.1080/08856250903450848

Sadioğlu, Ö., Batu, E. S., & Bilgin, A. (2012). Primary school teachers' opinions related to inclusion of students with special needs. *Journal of Uludag University Faculty of Education*, 25(2), 399-432.

Şafak, P. (2019). "Özel gereksinimli öğrenciler için eğitim ortamlarının düzenlenmesi" (Ayşegül Ataman, ed.) *Temel eğitim öğretmenleri için kaynaştırma uygulamaları ve özel eğitim* (5. Baskı), Vize Yayıncılık, Ankara.

Şekercioğlu, B. (2010). *Primary school branch teachers' opinions about problems they are facing during inclusive education*. (Unpublished Master Thesis), Gazi University, Institute of Education Sciences, Ankara.

Soylu, Y. & Aydın, S. (2006). Study on ımportance of the conceptual and operatıonal knowledge are balanced ın mathematıcs lessons. *Erzincan University Journal of Education Faculty*, 8(2), 83–95.

UNESCO (2017). *A Guide for Ensuring Inclusion and Equity in Education*. Paris: UNESCO.

Üçler, A. M. & Yıkmış, A. (2021). Determınatıon of the studıes related to ınstructıonal adaptatıon of turkısh language teachers who have ınclusıve students. *Abant Izzet Baysal University Journal of Faculty of Education*, 21 (3) , 1023-1043. DOI: 10.17240/aibuefd.2021.21.64908-882708

Van de Walle, J. A., Karp, K. S., & Bay-Williams, J. M. (2013). Elementary and middle school mathematics: Teaching developmentally (S. Durmuş, Çev. Ed.). Boston: Pearson.

Walton, E. (2011). Getting inclusion right in South Africa. *Intervention in School and Clinic*, 46(4) , 240–245.

Wilson, A. (2015). *A guide to phenomenological research. Nursing standard*, 29(34), 38-43. DOI:10.7748/ns.29.34.38.e8821

Yantır, N. (2007). *To set access level of geometry lesson with cooperative learning at primary maths schoolteaching students*. (Unpublished Master Thesis), Dokuz Eylül University, Institute of Education Sciences, İzmir.

Yıldırım, A. & Şimşek, H. (2016). *Qualitative research methods in the social sciences*.(10th ed.). Ankara: Seçkin Publications.

Yılmaz, E. & Batu, E. S. (2016). Opinions of primary school teachers about individualized education programme, legal regulation and inclusion implementation. *Ankara University Faculty of Educational Sciences Journal of Special Education*, 17(3), 247-268. DOI: 10.21565/ozelegitimdergisi.267316

Yusaini, N. A., Maat, S. M., & Rosli, R. (2019). Touch-Point mathematics instruction for children with autism spectrum disorder: a systematic literature review. *International Journal of Academic Research in Business and Social Sciences, 9(3)*, 609–625.

573 Sayılı Özel Eğitim Hakkında Kanun Hükmünde Kararname (1997a, 6 Haziran). Resmi Gazete (Sayı: 23011)