Investigating Content Teachers' Opinions on Inclusive Education of Visually Impaired Students

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Abstract

This qualitative study aimed to examine middle school content teachers' opinions about the inclusive education processes of visually impaired students. Data were collected through semi-structured interviews to have a deeper understanding of teachers' practices and the problems they face during the inclusive education process for visually impaired students. Participants were teachers of science (n=8), social studies (n=8), and mathematics (n=8). The data were analyzed using content analysis. It was found that science, mathematics and social studies teachers who have visually impaired inclusive students in their classes need support to increase their professional competence in preparing tactile or visual teaching materials during the instructional planning process, teaching according to both normal and visually impaired students, using technology to make the learning process of the visually impaired student easy and permanent, supporting visually impaired students to socialize with their sighted peers, assessing visually impaired students, and learning about visually impaired children and their education.

Keywords: Visually Impaired Students, Inclusive Education, Content Teacher, Middle School, Special Education

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INTRODUCTION

Based on the World Health Organization (WHO) classification of visual impairment, there are four levels of visual function: normal vision, moderate visual impairment, severe visual impairment, and blindness (WHO, 2013). Moreover, the combination of moderate visual impairment and severe visual impairment is expressed under the term low vision (WHO, 2013). In addition to these levels, according to the International Statistical Classification of Diseases [ICD-10], blindness (ICD: 3rd, 4th and 5th codes) is defined as the visual acuity of the better-seeing eye between 20/400 (3/60) and 20/1200 (1/60) or the presence of visual field loss, with the best possible correction. Low vision (ICD: 1st and 2nd codes) refers to a visual acuity of less than 20/70 (6/18) and equal to or greater than 20/400 (3/60) in the better-seeing eye, with the best possible correction (WHO, 2006).

In Turkey, the terms *visually impaired* and *low vision* are defined in different ways in legal documents and literature. In the Special Education Services Regulation (2020), a visually impaired individual refers to an individual who needs special education or support education services due to partial or complete loss of vision. In the literature, blind and low vision are defined in two different ways: legal and educational. Regarding the legal definition, blindness is a normal visual acuity of 20/200 or less in the better-seeing eye of the individual, with all possible corrections, and a visual field of less than 20 degrees (Özyürek, 1998; Şafak, 2013; Tuncer, 2013; Aslan, 2015). Low vision refers to an individual's normal visual acuity between 20/70 and 20/200 in the better-seeing eye, with all possible corrections (Özyürek, 1998; Şafak, 2013; Tuncer, 2013; Aslan, 2015). Regarding the educational definition, a blind has severe visual acuity loss and can continue education by reading with the tactile alphabet (Braille) and listening with audio books (Şafak, 2013). In addition, blind individuals need tactile-auditory materials in their academic activities and cannot use their visual senses for learning (Tuncer, 2005). The educational definition describes an individual with low vision as one who can read large or normal font written materials with the help of magnifying glasses (Özyürek, 1995; Şafak, 2013). Besides, an individual with low vision needs assistive devices (e.g., glasses), environmental regulations such as lighting, and can use their eyesight for learning purposes (Tuncer, 2005). In this study, the term "*visually impaired*" was used for people with low vision and those who could not use their eyesight at all or use it very limitedly.

Children with disabilities must first be identified to benefit from special education as well as support services and to be placed in educational settings (Avcıoğlu, 2011; Eripek, 2007). In Turkey, the diagnosis and evaluation of children with disabilities are run in two different ways: medical and educational (Yıldırım Doğru & Saltalı Durmuşoğlu, 2011). The medical diagnosis of visual impairment is made by ophthalmologists with medical devices and measurements (Gürsel, 2011). This diagnosis helps in determining the eligibility of children in receiving special education and support services. With decree law no 573 issued in 1997 in Turkey, after the medical diagnosis, an educational evaluation is made, and then based on this evaluation, the educational goals of children who need special education are determined. Finally, they are placed in educational settings in line with objectives. Educational evaluation is done by teachers working in Guidance and Research Centers (RAM) through the Criterion-Dependent Measurement Tools. Educational evaluation helps determine the development and academic competencies of visually impaired children and their educational needs. Visually impaired children are directed to different educational institutions in line with their educational needs.

There are various educational settings such as regular classes, special education classes, and day or boarding special education schools (schools for the visually impaired) where visually impaired children can receive education (Çakmak, Karakoç, Şafak, & Kan, 2013). As of 2022, there are 18 schools for the visually impaired in Turkey (17 primary schools and one middle school). A total of 1054 students were studying in these schools in 2021. This number includes students in special classes opened for children with more than one disability. The last school for the visually impaired, which provides education at the primary school level, was opened in 2015. With the enactment of decree law no 573 in 1997, today visually impaired students are mostly placed in regular classes and special education classes, but few receive education in schools for the visually impaired, which are separate

educational settings. The 2021 data show that 114 991 (about 75%) of the 153 937 students receiving special education at primary schools had education in inclusive settings. At the middle school level, 144 769 (about 80%) of 180 600 special education students were educated in inclusive settings. Although the number of visually impaired students in special classes or regular classes is not known clearly, according to numerical statistics, most of them received education in inclusive classes. Visually impaired students, who are placed in regular classes as inclusive students, receive education with their normal peers by classroom or content teachers.

The basic criteria for a successful inclusive education are teachers, normal students, inclusive students, families, school administration, physical environment, and individualized education programs (Batu 2000; Kırcaali-İftar 1998). The role of content teachers is crucial to the achievement of visually impaired middle school students in inclusive education. Visually impaired students receiving inclusive education at the middle school level in Turkey take 29 hours of compulsory lessons: Turkish (6 hours a week), Mathematics (5 hours a week), Science (4 hours a week), Social Sciences (3 hours a week) and other courses (Religion, Foreign language, Technology, Physical Education). There are important variables for visually impaired students receiving education in regular classes, such as the content teacher's ability to meet the needs of visually impaired students and their positive attitude towards the education of those students in the regular classes, arrangement of educational environments, provision of educational materials, and creating opportunities for socialization processes with other students. If these variables are well planned and presented, visually impaired students can receive more qualified education inside and outside the regular classes. The classroom environment should be designed (*lighting type and rate, seat, etc.*) according to whether the individual is blind or has low vision. In addition, educational materials should be selected according to the type of disability (*for students with low vision: determining the reading and writing tools, font size, point size, line spacing, the contrast between the background and the color of the text in the reading materials, simplification of the visuals in the written books, etc.; for visually impaired students: Braille tablet as a writing tool, using a typewriter or computer with screen reading program, braille or audiobooks, etc.*). Moreover, socialization processes with sighted peers are required (*making friendships, participating in activities, doing homework, spending time together in free time, etc.*), and it is necessary to increase the professional competencies of the content teachers (*teaching Braille reading and writing, supporting and teaching the visually impaired students to use technological tools such as computers with audio programs in the classroom, providing the necessary arrangements in the educational documents according to the student's visual status, ensuring that the student learns by seeing or touching, teaching independent movement skills, etc.*). Supporting students with low vision or visually impaired students and their classroom as well as content teachers in these areas will ensure that those students receive education under the best possible equal conditions with their sighted peers in regular classes.

Content teachers take a 2-credit "Special Education and Inclusion" course in the seventh semester of their BA education. Prospective teachers have the opportunity to meet with inclusion students in practice by taking the "Teaching Practice I" course in the same semester. However, these courses are limited to raising awareness among prospective classroom or content teachers. After completing their university education and starting their professional life, prospective teachers can work with inclusive students who have different types of disabilities. Teachers support their professional competencies by participating in professional development training programs in the field of special education. Although they participate in these trainings, teachers working in classrooms with inclusive students have serious problems in preparing and implementing Individualized Education Program (IEP) (Yorulmaz,2015; Pamuk,2016; Evyapan,2020), managing large classes (Kewaza&Welch 2013; Özgüneş,2016; Karaca, 2018), supplying and preparing teaching materials (Kızılaslan,2016; Okçu,2016; Zorluoğlu, 2017; Yazıcı 2017; Çay, Yıkmış & Özgüç, 2020), and classroom management (Sanır, 2009; Komitoğlu, 2009; Zengin-Bağcı, 2010; Koçoğlu, 2013; Söylemez, 2013; Adıgüzel, 2016; Sevce, 2017). In addition to these problems, the factors arising from the nature of the content lessons create difficulties for teachers to teach visually impaired students or for visually impaired students to learn the relevant lesson. For example, the courses such as Mathematics, Science, and Social Studies (geography) mostly contain abstract concepts as well as

visual elements such as symbols, tables, graphics, and figures. Besides, the presence of vision loss in students with low vision or visually impaired students also makes such courses more difficult for students and content teachers. Regarding mathematics, science and social studies courses, research investigating visually impaired inclusive students at the middle school level in Turkey has mostly focused on the structure of teaching tools within the framework of units or themes. Various studies were conducted on the teaching adaptations of mathematics teachers of visually impaired middle school students, such as developing tactile teaching materials for teaching geometric shapes (Horzum & Bülbül, 2017), the needs of the visually impaired students regarding the concept of algebra (Aktaş & Argün, 2021), and teaching the polygon concept to visually impaired students (Horzum & Arikan, 2019). Similarly, studies examined the teaching adaptations of science teachers of visually impaired middle school students, such as adapting the "*Electricity in Our Lives*" unit at the 8th grade level for the visually impaired (Sözbilir & Okçu, 2016), adapting the "*States of Matter and Heat*" unit at the 8th grade level for the visually impaired (Kızılaslan & Sözbilir, 2017), adapting the "*Systems in Our Body*" unit at the 6th grade level for the visually impaired (Yazıcı, 2017), and adapting the "*Particulate Structure of Matter*" unit at the 6th grade level for the visually impaired (Zorluoğlu, 2017). Furthermore, research focused on the teaching adaptations of social studies teachers of visually impaired middle school students, such as museum education of visually impaired students through tactile and auditory information (Buyurgan & Demirdelen, 2009), and teaching map knowledge to 9th grade visually impaired students (Tanrıkulu, 2010).

The literature shows that research is mostly about the adaptation of the teaching tools for visually impaired inclusive students. However, in the inclusive education process, it is also necessary for teachers to know the characteristics of students with and without low vision, to determine the primary sensory organs used by students with low vision, to evaluate the functional vision skills of students with low vision, and to organize the environment and arrange materials for students with low vision or visually impaired students. teachers should also know how to plan the support education services, participate in professional development trainings on the education of students with low vision or visually impaired students, support the social skills of the students, use techniques to cope with possible behavioral problems and blindness tics and use technology during teaching. If inclusive education practices can be supported by taking these variables into consideration together with the adaptation of teaching tools, both visually impaired students and their teachers can experience a more problem-free education process. The aim of the study was to examine the opinions of middle school content teachers about the inclusive education. This research is important in terms of determining the difficulties experienced by science, mathematics and social studies teachers working in schools for the visually impaired, and identifying solutions based on their experiences. Besides, this research is considered important in terms of revealing the adaptations/arrangements that should be made in the teaching of science, mathematics and social studies courses to visually impaired students. This paper will contribute to literature since there is a limited number of studies on the related subject. Thus, this study aimed to determine (1) the instructional arrangements made by the teachers in the science, mathematics and social studies courses for visually impaired students, (2) the subjects that teachers had difficulty with, and (3) their solutions for effectively conducting science, mathematics and social studies courses.

METHOD

This qualitative research adopted a case study design. A case study is an in-depth analysis of one or more events, settings, programmes, social groups, societies, or other constrained systems. The situation represents a holistic system. A teacher, student or a newly implemented program can create a situation. A case study investigates a contemporary phenomenon in depth and within its real-life context (Stake, 1995; Yin, 2014, cited in Ozan et al., 2017). Explanatory case study was used in this study. Explanatory case studies provide information about a situation, serve primarily to make the unfamiliar familiar, and to explain connections with real-life situations (Yılmaz, 2014).

Participants

Participants were 24 middle school content teachers who were teaching visually impaired students. At first 36 teachers were reached and informed about the study. However, 24 participants agreed to participate in research. They were teachers of science (n=8), social studies (n=8), and mathematics (n=8). They were teaching in the provinces of Istanbul, Ankara, Yozgat, Kırşehir and Malatya, with an average 10-year teaching experience. Table 1 presents detailed information about the participants.

Table 1 Demographic Information of Participants

Branch	Experience (year)	Grade they teach	Student's vision level	Years of working with visually impaired students or students with low vision	Receiving professional development training on the visually impaired	Interview date	Interview duration
1 Science	10	7	A.G	3	-	06.04.2022	27 min
2 Math	7	7	A.G	3	-	06.04.2022	24 min
3 Social S	3	7	A.G	3	-	06.04.2022	28 min
4 Science	4	6	G.E	2	-	08.04.2022	25 min
5 Math	18	6	G.E	2	-	08.04.2022	23 min
6 Social S	13	6	G.E	2	-	08.04.2022	27 min
7 Science	2	6	A.G	2	-	13.04.2022	23 min
8 Math	6	5	A.G	1	-	13.04.2022	29 min
9 Social S	6	5	A.G	1	-	13.04.2022	25 min
10 Science	8	5	A.G	1	-	27.04.2022	24 min
11Math	7	5	A.G	1	-	27.04.2022	29 min
12 Social S	4	5	A.G	1	-	27.04.2022	27 min
13 Science	9	8	G.E	4	-	28.04.2022	24 min
14 Math	11	8	G.E	4	-	28.04.2022	26 dak
15 Social S	8	8	G.E	4	-	28.04.2022	26 min
16 Science	16	6	G.E	2	-	29.04.2022	23 min
17 Math	14	6	G.E	2	-	29.04.2022	25 min
18 Social S	8	6	G.E	2	-	29.04.2022	27 min
19 Science	6	5	A.G	1	-	03.05.2022	24 min
20 Math	17	5	A.G	1	-	03.05.2022	28 min
21 Social S	14	5	A.G	1	-	03.05.2022	25 min
22 Science	18	7	A.G	3	-	04.05.2022	23 min
23 Math	19	7	A.G	3	-	04.05.2022	27 min
24 Social S	15	7	A.G	3	-	04.05.2022	24 min

Interview Form

The Interview Form was developed in three stages. First, the researcher reviewed the literature and developed a draft interview form. In the second stage, the draft form was shared with two field experts who completed their doctorate in the Education of the Visually Impaired in the USA, through face-to-face interviews. Based on the expert opinions, it was revised. The final version was discussed once again with the field experts, and the second phase was completed. In the third stage, the form was shared via e-mail with a total of six middle school mathematics, science and social studies teachers who had visually impaired inclusive students in their classes. Teachers expressed their opinions on the content of the interview form via e-mail within about 4 working days. In line with their opinions, Social Skills was added as a separate question, and the semi-structured interview form was finalized.

Interview questions consisted of topics such as how the pre-lesson planning stage was prepared for visually impaired students, how the course materials were created, how the course presentations were made, how instructional technologies were used during the presentations, the academic evaluation processes of the visually impaired students, and the views of teachers on social skills.

Data Collection

The data were collected during the spring term of the 2021-2022 academic year. All participants were interviewed. The researcher phoned the participants to determine the date and time for the interviews that were carried out online. Before the interviews, the teachers were informed about the purpose and scope of the research, and their permission was requested to record the interviews. The teachers were told that their personal and school information would be kept confidential; thus, a participant consent form was used. Each teacher was interviewed individually, and the interviews lasted an average of 25 minutes (Min: 23, Max: 29). All interviews were recorded. At the end of the interview, the researcher appreciated the teachers for their participation.

Data Analysis

Content analysis was used to analyze the data. Content analysis is an effective method for classifying and comparing texts to make theoretical inferences (Cohen, Manion, & Morrison, 2007). In this context, the views of participants were analyzed in detail. Based on the analysis, themes and sub-themes were reached. These themes were categorized as preparing a teaching plan, developing teaching materials, presenting a lesson, using technology, social skills, assessment, and professional competence. The interviews were coded by the researcher and the themes were determined. To ensure the reliability of the analysis of observation and interview data, Miles and Huberman's (2015) formula was used: Reliability = [Number of agreements /(Total number of agreements + disagreements)]. The reliability was found to be .89. While analyzing the data gathered from seven open-ended questions, coding was done for each item. Firstly, the statements that were divided into small parts were labeled. Qualitative researchers are not interested in the frequency of codes, but in how the codes relate to each other (Creswell, 2013). Therefore, the semantic integrity of the codes was preserved and the frequency of the codes and their relationship with each other were examined. Content analysis was used to bring together similar codes and categories and make them meaningful (Yıldırım & Şimşek, 2005). The questions were coded independently by each researcher and were themed by considering common codes. Coding was done by two experts for the reliability concerns, and Cohen's Kappa (k) coefficient was found to be 0.62. Kappa statistic takes values between 0 and 1, and .40 or above values are generally acceptable (Wynd, Schmidt, & Schaefer, 2003). Quotations were given to support the themes. In addition, member checking was achieved by sharing the results with the teachers.

FINDING

Based on the content analysis, the findings were presented under seven different themes: preparing a teaching plan, developing teaching materials, presenting a lesson, using technology, social skills, assessment, and professional competence. The areas where teachers had difficulty, the arrangements they made, and their suggestions were given in detail in the tables below.

Theme 1 Preparing a Teaching Plan

Difficulty Areas	Arrangements Made	Suggestions
Planning cannot be made in line with the educational evaluation report (18)	I do not make any arrangements (15)	There should be support from a field expert on how to plan (21)
Not being able to prepare a lesson plan according to the needs of students with low vision or visual impairment (9)	When developing plans, I make the visual stimuli in the course content partially tactile or auditory (7)	There should be a separate teaching plan (15)
		Special education teachers or guidance counselors should attend group meetings (4)

Regarding content teachers' opinions about difficulties that they have while preparing a lesson plan for visually impaired students, the educational evaluation reports do not help prepare lesson plans (n=18) and teachers have difficulties in preparing a lesson plan according to the needs of visually impaired students (n=9). T9 said, "*The information in the educational evaluation report does not give an idea about how I will plan the social studies course topics with my student with low vision.*" T16

stated, "*The educational evaluation report did not provide information on how to plan the subjects in the science curriculum according to visually impaired students.*" T14 argued that "*According to the educational evaluation report, it is not possible to develop a mathematics lesson plan for visually impaired students.*"

Given the content teachers' opinion about the arrangements they made while preparing a lesson plan for visually impaired students, the teachers did not make any special arrangements while developing a teaching plan (n=15), and they tried to make the visual elements auditory or tactile (n=7). T6 said, "*I do not know how to make an arrangement for a student who has no vision in the social studies lesson plan.*" T17 stated, "*Not in all subjects, but in some geometry subjects, I give plastic concrete geometric shapes to my students who do not see and ask them to examine.*" T13 uttered, "*I include detailed verbal descriptions to make some concepts in science subjects more concrete for visually impaired students.*"

Regarding teachers' suggestions for the problems that they encounter while preparing a lesson plan for visually impaired students, according to teachers, special education teacher support should be provided while developing a lesson plan for those students (n=21), there should be a teaching plan different from that of other students (n=15), and a special education teacher or guidance counselor should participate in group meetings (n=4). T1 said, "*I am a science teacher. I don't think I have any shortcomings in my field knowledge, but I need support from a special educator in adapting the lesson plan I prepared for normal children to the student with low vision.*" T5 argued, "*There should be a separate mathematics program from general education for visually impaired students, and a plan should be prepared according to that program.*" T24 voiced, "*There are three social studies teachers, including me, in the school where I work. I have a student with low vision in my class. We cannot prepare a lesson plan as a group. There should be a special education or guidance teacher in the group meetings.*"

Theme 2 Developing Teaching Materials

Difficulty Areas	Arrangements Made	Suggestions
Not being able to make teaching materials tactile (15)	I cannot make any arrangements (15)	MEB should provide large print and embossed materials (18)
Not being able to adapt written and visual content for students with low vision (9)	I hand out large print copies (10)	There should be auxiliary staff in the classroom (3)
Time limit to arrange material (6)	I sit close to the smartboard and enlarge the content (10)	
Unable to create additional resources (5)	I'm trying to emboss some shape (2)	

The teachers stated that they could not make the teaching materials tactile for visually impaired students (n=15), could not adapt the written and figurative visual content for them (n=9), could not spare enough time to create materials (n=6) and had difficulties in creating additional resources. T5 emphasized, *While I can easily explain the shapes in the mathematics lesson, especially to the students who see the geometry subjects, through the shapes, I cannot make these figures embossed for visually impaired students, and I cannot fully teach the lesson for that student.*" T22 said, "*Many Science lesson topics contain visual elements in books and digital content such as the subject of parts and functions of a flower. Small and complex visuals in many science textbooks and digital course contents cannot be seen by students with low vision. If these pictures were a little simpler, my students could see them much better.*" T21 stated, "*I have a 40-hour course load per week. It is not possible for me to prepare tactile materials for social studies topics for my student who cannot see at normal class pace.*"

It was found that teachers did not make any arrangements for visually impaired students regarding teaching materials (n=15), gave large-size photocopies (n=10), lectured by sitting close to the smart board and magnified the screen (n=10), prepared embossed materials for some subjects (n=2). T6 underlined, "*I don't make any arrangements to develop materials for my students with low vision, I explain the subject to them over and over again.*" T1 stated, "*I sit my student with low vision*

close to the board and enlarge the text images on the screen. I give my student an enlarged version of the lesson notes. I find it difficult to describe many images because color copier is not available at school." T17 said, "*I am teaching my visually impaired students on geometry subjects through concrete geometric figures*".

The suggestions were as follows: the Ministry of National Education should provide support for large print and embossed materials (n=18), and there should be auxiliary staff in the classroom (n=3). T1 suggested, "*The Ministry of National Education should provide us with material support for students with low vision or visual impairment*". T13 recommended, "*There should be an auxiliary staff or an intern for such needs in classes with inclusive students. We have too many responsibilities such as course load. Such an application would be beneficial.*"

Theme 3 Presenting a Lesson

Difficulty Areas	Arrangements Made	Suggestions
I do not know exactly how to teach. I teach them the same way I teach normal children (12)	I don't make arrangements (16)	I need support on how I should teach (8)
I have difficulty in conveying images with figures and graphics (8)	I explain the important points of the lesson to my student twice (12)	
I have difficulty in getting a reaction from my student (7)	I repeat the topic individually in the support education room (4)	

The teachers did not know how to make a lesson presentation for students with visual impairment (n=12). Besides, they had difficulties in transferring the visuals containing figures or graphics to the students (n=8) and getting a reaction from them (n=7). T14 complained, "*I am a mathematics teacher, I do not know exactly how to teach those children. I teach them the same way I teach normal children. I think that this is not the right way; I must teach these children in different ways.*" T18 said, "*I don't know how to explain it to my student who does not know topics such as map knowledge and landforms in the social studies course. Since they cannot see the visuals, I do not think that they acquired the subjects.*" T11 argued, "*While teaching science subjects, I use the question-and-answer technique to repeat subjects. While normal students participate in the question-and-answer part, students who have vision problems remain silent. Although I am uncomfortable with this silence, I do not want to force them to speak. Otherwise, forcing them to speak may make them be more introverted.*"

Regarding arrangements, it was found that the teachers did not make any arrangements for the visually impaired students (n=16), they explained the topics to the visually impaired students for the second time (n=12), and they repeated the subject in the support training room (n=4). T8 stated, "*I don't make any special arrangements for the child in my class who has vision problems while teaching mathematics subjects.*" T22 voiced, "*After the lesson, I repeat the important parts of the subject to my student who has vision problems.*" T17 uttered, "*I repeat the topic individually in the support education room during extracurricular times.*"

The difficulties teachers experience while presenting the lessons for the visually impaired students were as follows, they suggested training on how to teach those children (n=9).

Theme 4 Using Technology

Difficulty Areas	Arrangements Made	Suggestions
I do not know which technological tool(s) I should use (16)	I do not use technology (12)	I should get support regarding technology and technology use (9)
	I present the image and text from the smart board by enlarging them (10)	
	I give lesson notes in large print (10)	
	I encourage the use of a magnifying glass (3)	
	I encourage laptop use (3)	

Regarding difficulties in using technology while teaching visually impaired students, it was found that teachers did not know which technological tools the visually impaired students would use (n=12). Besides, they had difficulties in transferring images with figures or graphics to the students during the presentation (n=8) and in getting a reaction from visually impaired students (n=7). T5 complained, "*My student cannot see. He cannot use any technological tools. Moreover, I don't have any information about which technologies the student should use in mathematics class.*" T9 explained, "*Neither I nor my student use technology during lessons. I do not think that my student's parents have economic power in terms of technology.*" T8 said, "*I don't know which technological tools my student should use, but we do not have a serious problem.*"

Considering their opinions about the regulations they make, it was observed that teachers did not make arrangements for the visually impaired students to use technology (n=12), they taught by enlarging the images and texts on the smart board (n=10), they gave large print photocopies (n=10), they encouraged the use of a magnifying glass by students with low vision to (n=3), and they encouraged laptop use (n=3). T4 stated, "*My student cannot see. I don't know what kind of technology the student should use in science class. Also, my student doesn't use any technological tools, so I didn't need to make any adjustments.*" T1 argued, "*My student came to Turkey after graduating from primary school in the Netherlands. He had a vision problem when he was in primary school. They gave him a hand magnifier there. He was already using his magnifying glass when he started his education at this school. I always encourage him to use it, as I have observed that he learns more easily with a magnifying glass. In particular, he cannot see complex pictures such as cell structure in detail without a magnifying glass. However, when he uses a magnifying glass, both he and I are more comfortable in the lessons.*" T20 voiced, "*My student usually uses a laptop computer in the lessons. He is comfortable while writing, and he can read texts easily by enlarging the screen. I tell him that using a computer increases his academic success even more*".

Their suggestion was as follows: I should get support in terms of technology and technology use (n=9). T5 said, "I don't know what kind of technological tools these kids should use. Even if my student has the required tools, I do not know how to make him use them during the lessons. I think that I need a support training on the technological tools that my disabled student can use."

Theme 5 Social Skills

Difficulty Areas	Arrangements Made	Suggestions
I have difficulty in communicating (16)	I cannot make any arrangements (5)	Practices of the counselors (14)
I cannot make them do an activity with their friends (4)	I encourage peer support (14)	
	I recommend him to be with his friends (16)	

Teachers stated that they could not communicate with visually impaired students (n=16) and had difficulty in getting them to do any activity with their classmates (n=4). T22 emphasized, "*I have been teaching this student for three years. So far, he has never initiated communication with me. As far as I have observed in my classes, he has never started communicating with his friends. If I or his friends talk to him, he utters short sentences or single words. Both I and his classmates have accepted his situation.*" T14 mentioned, "*My student is always alone and quiet, both in the classroom and in the school garden. In fact, his friends do not exclude him in any way, but I have never seen them doing an activity together.*" T9 said, "*My student has low vision. Most of the time, he doesn't have a break and sits in the class. I really want him to have a break with his other friends, but I don't force him. I think he felt in danger and scared because of his low vision. I can only get answers to the questions I ask. When his classmates ask him a question, he can answer, but their mutual communication is very limited.*" T17 voiced, "*While I am teaching mathematics both in the class and in the support education room, my student speaks in a low voice and hesitantly during the questions-and-answers part about the subjects related to the course.*"

Regarding teachers' opinions about the arrangements, they made for visually impaired students to perform social skills in the school, it was found that the teachers did not make any arrangements to support the social skills of the visually impaired students (n=5), tried to provide peer support (n=14), and told the child with low vision or visual impairment to spend time with his classmates (n=16). T2 said, "*I do not make any arrangements to support my student's social development. Because he is a 7th grader. I don't understand why an arrangement is made for a student of that age. I think that he will somehow strengthen his social aspect by communicating with his normal friends.*" T20 argued, "*My student is a very quiet and well-behaved child. I can say that I rarely saw him doing an activity with his friends. Sometimes I see him talking to a person just by the way. I encourage his casemates who are social to build a friendship with him. Those children do not offend me, but they complained as follows: Sir, we want to do something with him, but he does not want.*"

Given teachers' suggestions for the visually impaired students to perform social skills in schools, they recommended applications to be made by counselors to support the social skills of visually impaired students (n=14). T11 said, "*I feel very sorry for this child, I think he is alone. I don't know how to help either. I think that the school guidance service should work on this issue.*" T24 stated, "*I am a social studies teacher. I do not know exactly the characteristics of these children. This child shares the same environment with his friends socially but cannot establish social contact. I think the guidance teacher can carry out more beneficial studies.*"

Theme 6 Assessment

Difficulty Areas	Arrangements Made	Suggestions
I cannot use the written exams (16)	I cannot make arrangements (7)	Support for the assessment method can be offered (8)
I cannot find any adapted questions on additional resources (3)	I conduct oral exams (16)	
	I'm a reader in exams (11)	
	B I prepare large print exam questions (10)	

As seen in Theme 6, teachers could not use written exams for visually impaired students (n=16), and they could not find any adapted questions based on additional resources (n=3). T14 underlined, "*My student has no vision. Thus, I cannot use written exams. In addition, since many subjects in mathematics course include shapes and graphs, I do not have the opportunity to give an appropriate exam to my student.*" T13 explained that "*I try to describe images in science exams, but I don't think it is enough*". T24 stated, "*There are too many visuals in social studies exams, so I can't give written questions and subject test exams to my student.*"

Regarding teachers' opinions about the arrangements that they make to assess visually impaired students through exams, it was found that teachers did not make any arrangements (n=7), they used oral exams (n=16), became a reader in the exams (n=11) and prepared large-size exam questions (n=10). T8 said, "*My student partially sees. For this reason, I do not make any arrangements for the exams.*" T3 explained, "*I use oral exams in the social studies course.*" T2 stated, "*My student uses a magnifying glass while reading, but since this device does not work while marking or writing. Thus, I act as a reader.*" T19 said, "*I prepare the exam papers in large fonts because my student has low vision. He can do it more comfortably that way.*"

Teachers suggested that they should be provided with support regarding assessment methods (n=8). T23 said, "*I don't know what else to do apart from enlarging the text. We need to get support from field experts in this regard.*" T14 underlined, "*My student has no vision, so I don't use written exams. In addition, since many subjects in mathematics course include figures and graphics, I cannot prepare an appropriate exam for my student. I need support in this regard.*"

Theme 7 Professional Competence

Difficulty Areas	Arrangements Made	Suggestions
I felt professionally inadequate in helping my student (21)	I did not make any arrangements (14)	There should be trainings on the characteristics and education of visually impaired children (24)
I was worried for both my student and myself (18)	I tried to get support from the guidance service (8)	Special education teacher support (14)
I couldn't find support for my student's education life (6)	I searched sources such as the Internet (4)	

Teachers stated that they could not help students with low vision or visual impairment professionally (n=21). They were worried for both their students and themselves (n=18), and they could not find support for their visually impaired students (n=6). For example, T1 said, "*I have been teaching my student for three years. When the guidance service told me that I would have a visually impaired student, I was shocked and couldn't believe it. I thought that these children had their own schools and that the education they would receive in those schools would be better for them. I even talked to the mother of my visually impaired student on the first day of the school. I love my student right now; I'm trying to help him. Although I have been teaching him for three years, I still think that I cannot support him enough in science lessons.*" T9 stated, "*It is my sixth year in the profession. When I saw my student in the classroom, I started to worry both for him and for myself. I had no experience in terms of their education. For this reason, it made me think a lot about how I could harm my student unconsciously, how he could act in the school, how he could behave in the lessons or during the breaks.*" T14 voiced, "*I have been a mathematics teacher for 11 years. In the last four years of my professional life, I taught mathematics to a visually impaired child for the first time. I had no knowledge or experience in this field. I have always approached my student with compassion, but unfortunately, I could not reach any support regarding what kind of education I should provide for this child.*"

Teachers stated that they did not make any arrangements regarding their professional competencies for people with low vision or visual impairment (n=14), tried to get support from the guidance service (n=8) and searched from sources such as the internet (n=4). T8 said, "*It is very difficult or even impossible for me to explain all the subjects of mathematics to a visually impaired student. My student hardly ever sees. Especially, we cannot handle subjects that require figures and graphics at all. I don't know anything about special education, I just love this student and feel sorry for him. I can say that I did not receive any training that would increase my professional competence in the field of special education*". T17 explained, "*I and our counselor often exchange ideas in order to provide better education to my visually impaired student. His suggestions enable me to teach my lesson better.*" T1 stated, "*I search on the Internet to be more beneficial to my students, and I try to apply the applications I see and read.*"

They recommended trainings on the characteristics and education of students with low vision or visual impairment (n=24) and special education expert support (n=14). T9 said, "*It is very good that these children are educated with normal peers. However, we need to be supported professionally. There should be teacher training on how we should proceed in such situations, and we should be involved in those trainings.*" T24 voiced, "*I find it very difficult to include my visually impaired student in the lesson. The instructional planning and practices we will make under the guidance of the special education teacher will be very beneficial for the visually impaired child and for us as well.*"

DISCUSSION AND SUGGESTIONS

This study aimed to examine the opinions of middle school content teachers about the inclusive education of visually impaired students. The findings of the study show that the educational evaluation reports do not give an idea about the instructional plans of the teachers for the lessons they will teach. While many participants never examined the educational evaluation reports, some emphasized that the information in the report did not give any idea for developing a plan for social,

science and mathematics subjects. Teachers stated that they would like to see in their educational evaluation reports how they would teach the subjects such as the structure of matter, exponential numbers or map knowledge to visually impaired students or those with low vision. The literature supports that content and classroom teachers need information about how to plan the education of students with special needs, and they want to learn who and how they will cooperate (Hettleman, 2004). Classroom teachers face many problems about what the reports from RAM mean and how to plan for the children in the next process (Işıkdoğan Uğurlu, Kayhan, 2018; Sarı, 2019).

It was observed that most of the teachers had difficulties in preparing the course teaching materials tactile. This situation shows that teachers have deficiencies in the process of developing tactile materials for visually impaired students. It is normal that participating teachers have difficulties in developing tactile materials for visually impaired students because they have rarely encountered those students in their undergraduate education or professional lives. Various studies advocate that mathematics teachers have difficulties in developing tactile materials (Aktaş & Argün, 2021; Horzum,2018; Bülbül, Garip, Cansu & Demirtaş,2017; Horzum & Bülbül, 2017, Hacısalihoğlu-Karadeniz 2017; Hacısalihoğlu-Black Sea 2017; Horzum,2016; Brian, Haegele 2014; Buhagiar, Tanti 2011; Karshmer, Gupta & Pontelli, 2007; Spindler,2006; Thompson,2005). Similarly, research underlines science teachers' difficulties in developing tactile materials (Karakoç & Aslan, 2022; Kızıaslan, 2020; Metin & Altunay, 2020; Zorluoğlu&Kızılaslan 2019; Sözbilir, Gül, Okçu, Kızıaslan, Zorluoğlu & Atilla 2015; Fraser & Maguvhe, 2008). Finally, researchers inform that social studies teachers have difficulties in developing tactile materials (Demir & Bican, 2019; Mengi, 2019; Dursin, 2012; Tanrıkulu, 2010). Therefore, the findings of this study confirm the literature, reporting that mathematics, science and social studies teachers have difficulties in preparing teaching materials for visually impaired students. While teachers could make some arrangements (such as preparing large fonts for students with low vision, enlarging the texts on the worksheets while making copies, and presenting the images on the smart board by enlarging the screen), they could hardly develop materials that would appeal to the sensory organs of visually impaired students. Based on these findings, it can be interpreted that content teachers of students with low vision or visually impaired students should be provided with supportive studies that help them design and develop teaching materials for these students.

It was found that science, mathematics and social studies teachers could teach students with low vision or visually impaired students, but they do not know how to make a presentation while teaching those students, and they could not convey maps, figures, graphics, and complex visuals to these students. This situation creates serious problems in the learning process and in equality of opportunity in education. For visually impaired individuals to continue their education, it may be necessary to use tools designed for their special needs and adapted teaching methods (Zorluoğlu & Sözbilir, 2017). Differences in obtaining information about students with visual loss are affected by teachers' past experiences but may vary according to whether students have low vision or no vision. The teaching materials prepared in accordance with the inadequacies of the visually impaired students facilitate learning as well as teacher's presentation of the course. The literature underlines that the academic success of visually impaired children can be increased with material arrangements (Yazıcı et al., 2021; Aslan & Karakoç, 2021; Aslan & Çakmak, 2020; Çakmak, Yılmaz & Işıtan, 2017; Aslan & Çakmak 2016; Şafak, 2010). Based on the findings of the study, it can be said that content teachers should receive professional development training on how they should perform their lessons in a way that addresses both sighted and students with visual loss or visually impaired students.

Another prominent theme is the social skill deficiencies experienced by visually impaired students. One of the main purposes of inclusive education is to include individuals with special needs in a social process together with individuals with normal development, with the support of a special education teacher (Sarı, 2005). This process not only ensures the development of individuals in need of special education but also ensures that individuals with normal development have information about many abilities and characteristics of individuals who need special education in the context of social learning (Batu & Kırcaali-İftar, 2005). Findings show that many teachers have difficulty in communicating with their students with low or no vision. To overcome these difficulties, they run peer

support, and they believe that this problem can be solved by the arrangements made by the guidance counselors, not by the arrangements they make. Some studies indicate that visually impaired students in inclusive education environments are more successful in social skills than those in separate education environments (McGaha & Farran, 2001; Buhrow, Hartshorne & Bradley-Johnson, 1998; Kekelis & Sacks, 1992). However, the results of this study differ from the studies presented in the literature. That is, students with low vision or visually impaired students have difficulties in performing social skills despite being in inclusive education environments. Although the child's low vision or blindness is a factor in experiencing these difficulties. It is also an important factor that content teachers do not know how to socially integrate both normal students and those with vision problems. For the successful realization of the socialization process, which is one of the main purposes of inclusive education, peers and teachers of the child with low or no vision need to be supported conspiratorially. This support should be provided not only by the guidance teacher or classroom teacher but also by the content teachers. In this context, practical support should be provided to content teachers about how students with visual loss can socialize without any problems.

The assessment theme shows that teachers have difficulties in assessing their students; therefore, they generally use different assessment practices compared to sighted students. Most of the teachers prefer oral exams instead of developing and applying written exams specific to students with low vision or visually impaired students. This situation creates discrimination in the assessment process and puts the evaluation security at risk. Besides, teachers have difficulty in producing alternatives for students with low vision, they could use alternatives such as preparing large print exams and providing reader support. Although this situation that occurs in the assessment process seems to be due to the student's vision problem, it is basically because the content teachers do not know how to assess the student with vision loss. Visually impaired individuals may encounter various difficulties in exams. The presence of visual content such as pictures, figures, graphics, and tables in the exam questions causes visually impaired individuals to be unable to answer the questions or demonstrate their performance. In addition, it causes visually impaired individuals to experience various difficulties in reading Braille, which is an exam arrangement. Since Braille is read by touching individual letters with fingertips, reading this text takes more time than reading with eyes (Gürel Selimoğlu, 2017; Şafak, 2017). Braille text takes up too much space, which makes it difficult to read, page through text and find the last studied place (Erin, Hong, Schoch, & Kuo, 2006; Wetzel & Knowlton, 2000). Individuals with low vision, on the other hand, cannot show their real performance due to various exam-related conditions such as small print size, limited exam time, and difficulties in using a pencil (Bolt & Thurlow, 2004). Allman (2009) states that individuals with low vision may have difficulties in reading skills such as having an appropriate reading speed during the exam, long-term reading, visual scanning and text review, shifting visual focus from one image to the question and back to the image, switching between the exam booklet and the answer key, capturing the whole picture visually, and following the lines. Moreover, the falling head shadow on the page makes it difficult to read (Safak, 2009; Tuncer, 2005). These situations that may occur during the exam are not related to the measurement purpose; however, it can cause a significant decrease in students' scores. (Bolt & Thurlow, 2004). For this reason, there is a need for appropriate and effective arrangements to eliminate the difficulties that may arise during the exam and to evaluate only the performance and qualifications (Zebehazy, Hartmann, & Durando, 2006). In line with these needs, support for assessment methods specific to students with visual loss should be planned and offered to content teachers. The need for this support was also expressed as a suggestion by the branch teachers.

The last theme was professional competence. Many teachers stated that when they learned that they have a visually impaired student or start working with them, they thought that they could not teach such a student, and this situation caused them to feel anxious. Various studies found similar findings (Akcan & Ilgar, 2016; Artan & Uyanık-Balat, 2003). It can be considered a normal situation for teachers who take limited credit courses in the field of special education in undergraduate education and cannot receive training in this field in their professional life. Content teachers should have a positive attitude toward the students who are affected by the inadequacy in their classes (Batu & Uysal, 2009), be able to make adaptations in line with the needs of the student (Tekin-İftar, 2007), and be able to prepare and implement activities and games suitable for the development of the student

to develop their motor, social, self-care, cognitive and language skills. (Hamill & Everington, 2002). To achieve all these things, teachers need to improve their current knowledge and self-development in the education of individuals with disabilities. Content teachers should be supported before and after the integration process of the inclusive student in areas such as the characteristics of the students with visual loss, the level of their current disabilities, their functional vision and its use in educational environments, the development of student's social skills, academic support, and assessment.

Consequently, science, mathematics and social studies teachers who have visually impaired inclusive students in their classes need support to increase their professional competence in preparing tactile or visual teaching materials during the instructional planning process, teaching according to both normal and visually impaired students, using technology to make the learning process of the visually impaired student easy and permanent, supporting visually impaired students to socialize with their sighted peers, assessing visually impaired students, and learning about visually impaired children and their education. Meeting these needs will make inclusive education more qualified and egalitarian for visually impaired students, sighted students, and content teachers. Supporting these needs of content teachers directly in the classroom and school environment through mentors will ensure that these needs are met more quickly.

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