



Teaching Subtraction with the Think-Aloud Method to a Student with Mild Intellectual Disability

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Abstract

The research was conducted to teach subtraction skills through the think-aloud method. The research was carried out through action research, one of the qualitative research methods. The study group in the research consists of a mildly intellectually disabled student. Data collection tools used in the research are criterion-referenced measurement tools employed in pre-test and post-test following action research process, performance record charts, teacher and student journals, and the think-aloud method student interview form. The research was recorded through tape recording during the whole process until the preparation and evaluation phases of the research action plans. According to the research results, it was observed that the student was able to perform the steps of subtraction independently; she obtained the information regarding the meaning of subtraction and told this. It is thought that this research will contribute to the literature since it improved the student's academic and self-expression skills.

Keywords

Intellectual disability
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Introduction

Individuals with intellectual disabilities are divided into three groups according to their intelligence levels. These are mild, moderate, and severe. The intelligence levels of students with mild disabilities are between 50-70, and these students cover 85% of students with special needs (Coşkun & Erdin, 2014). Mild mental learning difficulties delay acquiring basic literacy and counting skills (Kurtdele Fidan & Akyol, 2011). Students with mild intellectual disability may have difficulty in gaining literacy, reading comprehension, and basic math skills. Memory problems of students with intellectual disabilities due to lack of attention, inadequacy or absence of repetition strategies, and inability to generalize learned skills cause difficulties in recognizing important elements in the texts they read (Eripek, 2005). Individuals with intellectual disabilities have problems adapting to their environment because they cannot perform the physical and mental actions that society expects (Hosseini & Gursel, 2012; McKerr et al., 2020; Pursitasari, Allenidekania, & Agustini, 2020). They grasp abstract terms and concepts with power. They transfer knowledge and skills only as taught and have difficulty generalizing them (Coşkun & Geç, 2018). In addition, students with mild intellectual disabilities often have limitations in the effective use of cognitive and metacognitive strategies (Geary,

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Brown, & Samaranayake, 1991). They may have difficulties, especially in mathematics lessons that require metacognitive strategy. Students may have difficulties using basic mathematical skills and mathematical thinking or problem solving (Yönter, 2009).

Mathematics is a fundamental lesson that affects the lives of all students (Edwards, Rule, & Boody, 2017; Jordan, Resnick, Rodrigues, Hansen, & Dyson, 2017). However, students with intellectual disabilities have difficulties in acquiring new knowledge and skills in mathematics because the curricula are not prepared according to the needs of the students, teaching activities are not suitable for their level, abstract concepts rather than concrete materials used, and due to the lack of practice and feedback studies (Gürsel, 2000). In this direction, the important point of mathematics teaching for students with special needs should be ordered from easy to difficult, from simple processing processes to problem-solving skills (Parmar, Cawley, & Frazita, 1996). Karabulut's (2015) Understand and Solve Strategy showed that students with mild intellectual disabilities effectively solve change problems involving one-stage addition and subtraction. The subjects who win this strategy continue their end-of-training achievements 3, 5, and 8 weeks after the application ends. In this context, it is seen that individuals with mild intellectual disabilities can perform basic mathematical operations independently when they are trained according to their needs and levels. Nurjanah, Rohayati, and Riza (2021) showed that a learning model based on applied activity effectively develops the basic arithmetic skills of students with intellectual disabilities. Root, Cox, Hammons, Saunders, and Gilley (2018) found that a versatile mathematics application (schema-based teaching, video recordings, self-charging goal setting) effectively developed mathematical problem-solving skills of secondary school students with intellectual disabilities.

The Turkish Education System has accepted basic academic skills (basic mathematics and literacy) as compulsory for passing a grade (Ministry of National Education [MoNE], 2005). Mathematics, one of the basic academic skills, can support daily life skills and other academic fields and be a prerequisite. It has been observed that the mathematics curriculum prepared for general education classes does not adequately serve the educational needs of students with intellectual disabilities (Vaughn, Bos, & Schumm, 2003). In the Primary School Mathematics Curriculum, mathematics lessons are determined according to learning areas such as numbers and operations, geometry, measurement, and data processing (MoNE, 2018). In the mathematics curriculum organized for students with mild to moderate intellectual disability in Turkey, it has been observed that the learning outcomes continue with the teaching of basic mathematics topics, counting skills, and operations such as addition and subtraction (Dağseven-Emecen, 2008; Kırcaali-İftar, Ergenekon, & Uysal, 2008). When the literature is examined, it is seen that students make more mistakes in subtraction compared to addition (Badır, 2014; Varol & Kubanç, 2012). Yıkılmış, Kot, Terzioğlu, and Aktaş (2018) stated that among the studies on mathematics in special education in Turkey, they came across 37 studies in learning numbers and operations. According to their subject areas, four of these studies were related to subtraction. One of the basic mathematical skills, calculating skills, are learned in early childhood and pre-school period and are used continuously in daily life (Snell & Brown, 2000). Among these processing skills, students are sometimes expected to do addition and subtraction, finger counting, counting with objects, and counting lines mentally to reduce the teaching techniques. The strategies used for mental subtraction, which is the focus of this research, are listed as counting backward, counting forwards, doubling, and the difference strategy (Çıkılı & Gürbüz, 2019). In addition, teachers can support their subtraction skills by using strategies that will make students aware of their cognitive skills in teaching processes.

Self-management strategies should teach students to take responsibility for their behaviors (Schloss & Smith, 1994). Browder and Shapiro (1985) define self-management strategies as the process individuals use to control their behavior. Self-management strategies include giving pre-stimulus, instructions, monitoring, evaluation, and reinforcement (Yücesoy Özkan, Gürsel, & Kırcaali İftar, 2014). Self-directed learners can learn independently and regulate their behavior without directing others.

Thus, the teacher can devote more time to teaching without presenting support hint processes (Yücesoy Özkan, 2007). The purpose of teaching self-direction is to enable students to give verbal instructions independently without waiting for the instructions of others (Alberto & Troutman, 1995). In a study by Johnston, Whitman, and Johnston (1980), they examined the effectiveness of self-instruction in teaching addition and subtraction to students with mild intellectual disabilities. They observed an increase in students' math performance.

In this study, the think-aloud method was used to teach subtraction skills. The think-aloud method or protocol, one of the verbal reporting methods that enable students to understand the control of their skills in the thinking process, is an assessment technique in which the participants vocalize what they think and do during the teaching process or the instructions with their verbal proficiency (Sweeney, 2010). The data is generally recorded with audio recording and camera devices, and the data is analyzed (Van Hout-Wolters, 2000). Since the think-aloud method is included in the learning activity, it provides detailed information about the participant's mental processes (Van Hout-Wolters, 2000). It can be said that the use of the think-aloud method should take an important place in academic skills as it enables students to realize their thinking processes and control their thinking processes by teachers. Parmar (1992) aimed to examine the difficulties experienced by students with mild intellectual disabilities while solving verbal arithmetic problems. He presented 31 students with examples of problems in which four operation skills were used. The students' cognitive skills were tried to be understood with the think-aloud method, the data were recorded, and the examples were analyzed. Parmar (1992) identified the problems that students experience while solving problems. These include difficulty in reading, inability to identify the necessary operation, inability to identify the problem with manipulatives (concrete the problem situation), lack of self-correction, adding extra information, difficulty in classification, difficulties in concentration and permanence, and computational difficulties. As a result of this research, it was stated that instructional interventions containing more than one representation should be used. The think-aloud method could be useful to gain in-depth information in teaching sessions.

The think-aloud method has also been used in studies on problem-solving skills and strategy use of students with learning disabilities (Montague & Applegate, 1993; Ostad & Sorenson, 2007; Rosenzweig, Krawec, & Montague, 2011; Swanson, 1993). These studies observed that students with learning difficulties could not control their cognitive processes when solving problems compared to children with average or above-average success. It has been stated that students' cognitive processes can be controlled qualitatively and realistically by using the think-aloud method in individuals with learning disabilities. Sweeney (2010), who reached the results supporting these studies, examined the differences in students' problem-solving processes using the think-aloud method with and without learning disabilities. In his research, he stated that students with learning disabilities had difficulties in self-regulation during problem-solving. He also stated that metacognitive skill acquisitions should be included in educational practices for students with learning disabilities. He concluded that the think-aloud method effectively understands and controls students' cognitive skills. Gidalevich and Kramarski (2017) stated that the think-aloud method reveals metacognitive, motivational, and judgmental information in students with the help of loud data. Their study on fourth-grade students found that the students in the experimental group, in which the think-aloud method was applied, reached more accurate solutions for non-routine problems than the students in the control group.

Uçar-Rasmussen and Cora-Ince (2017) included three students with special learning disabilities who continue inclusive education in their study to determine the effect of the think-aloud strategy on the self-thinking processes of individuals with learning disabilities. As a result of the study, it was observed that the students had problems in the stages of their metacognitive skills such as enacting, associating with prior knowledge, monitoring, and correcting. It was determined that the students' performances changed significantly according to the starting levels after the teaching sessions with the

think-aloud method. In the research conducted by Bayraklı, İmamoğlu, and Özcan (2017), it was determined that the think-aloud method was effective in helping students become aware of their problem-solving processes. In addition, Özkubat and Özmen (2018) stated that the think-aloud protocol allowed explaining the application process to students who have learning difficulties in mathematics lessons.

When the literature is examined, it is seen that there are a limited number of studies on teaching basic subtraction skills to individuals with intellectual disabilities (Badır, 2014; Gınalı-Göriş, 2006; Katlav-Önal, 2008; Terzioğlu & Yıkımsı, 2018). Among these studies, Terzioğlu and Yıkımsı (2018) revealed that the point determination technique has a positive effect on the teaching of basic subtraction to students with an autism spectrum disorder. Kot, Sönmez, and Yıkımsı (2017), in their study with students with intellectual disabilities, found that the point determination technique in teaching addition is more effective and efficient than the number line strategy. On the other hand, Çıkılı and Gürbüz (2019) tried to determine the strategies used by individuals with a mild intellectual disability while adding and subtracting. Today, the search for effective teaching methods and techniques in teaching mathematical skills to individuals with intellectual disabilities continues, and more research is needed on this subject. This study sought to answer whether using the think-aloud method for subtraction is an effective teaching method for mildly intellectually disabled students. Therefore, in this study, it is thought that presenting the think-aloud method as an alternative method for gaining basic operational skills of a student with an intellectual disability will contribute to the literature.

Aims and Research Questions

This research searches for an answer to the question, "Can the think-aloud method overcome the difficulties a student with a mild intellectual disability faces in subtraction?". In this direction, the sub-problems of the research are presented below:

1. What difficulties does a student with a mild intellectual disability face in subtraction that does not require decimal conversion?
2. Can a student with a mild intellectual disability's difficulty in subtracting a single-digit number from a single-digit number without decimal conversion be eliminated with the think-aloud method?
3. Can a student with a mild intellectual disability's difficulty in subtracting a single-digit number from a two-digit number without decimal conversion be eliminated with the think-aloud method?
4. Can a student with a mild intellectual disability's difficulty in subtracting a two-digit number from a two-digit number without decimal conversion be eliminated with the think-aloud method?

Method

This study examined the learning process of subtraction using the think-aloud method on a student with a mild intellectual disability. For this purpose, action research, one of the qualitative methods, was used. Action research is an approach that the practitioner carries out directly or with a researcher, to reveal the problems related to the application process or understand and solve an existing problem (Yıldırım & Şimşek, 2016). This research was carried out in the form of collaborative action research. Collaborative action research is the systematic work of multiple researchers on an educational problem in a school or university setting (Hendricks, 2006). In this study, more than one researcher, experts in special education and mathematics education, worked together on the problem experienced by a student with mild intellectual disability who had difficulty in subtraction. The special education classroom teacher's practice of the think-aloud method and the mathematics teacher's expertise in teaching the achievements related to subtraction led to the selection of collaborative action research.

The think-aloud method provides detailed reporting of the mental processes (thinking, questioning, inference, evaluation) used in the information processing processes within the learning processes (understanding what is read, four operations, problem-solving, etc.) (Özkubat & Özmen, 2018). The reason for choosing the think-aloud method is to eliminate the difficulties experienced by the student by making an audio analysis of their thinking processes and noticing faulty or incomplete thinking processes in the subtraction skill. The suitability of the think-aloud method was decided by looking at the student's performance. Unlike other methods in the literature, it is assumed that the mental processes of the student will be analyzed with the think-aloud method, the thought processes will be expressed aloud, and the errors in the subtraction skill will be corrected. In addition, the fact that the student will acquire the subtraction skill and transfer it to other academic skills has been effective in choosing the method. The characteristics and performance of the participant who was taught subtraction through the think-aloud method are below.

Participant

This research was carried out with a special education student with a mild intellectual disability studying in the sixth grade of a secondary school in the Western Black Sea Region. The participant is an 11-year-old female student attending a special education class. This student was selected by the convenient sampling method, one of the purposeful sampling methods. The researcher, who was in the practitioner's role in the research, observed Ayşe for a long time before the study, as she was her classroom teacher. Seeing that the student had difficulty in subtraction, the researcher conducted pre-research interviews to determine the student's prior knowledge. The researcher checked the student's previous learning using the prerequisite skill list during these interviews. As a result of the interviews, it was determined that the student could read and write numbers and basic rhythmic counting skills, do the addition, and read and understand simple reading texts. On the other hand, it was determined that the student had problems arranging her thoughts about operations in mathematics lessons, could not concentrate in the early stages of the teaching process, confused rhythmic counting skills (forward rhythmic counting and backward rhythmic counting), and had difficulties, especially in subtraction. As a result of observations and interviews, expert faculty members in mathematics and special education were consulted among other researchers regarding the inclusion of the student as a participant in this research. Additionally, the special education teachers' opinion about using the think-aloud method to solve the problem experienced by the student in the subtraction process was taken. The student's other classroom teacher stated that subtraction or performing any academic skill with the think-aloud method would eliminate the confusion in their thought processes and increase their self-expression skills. All researchers supported the use of this method. In addition, the school counselor's approval was also obtained for selecting the participant following the purpose of the study.

Knowing how to read and write and having prerequisite skills to acquire subtraction skills was important in determining the student's participation. Due to research ethics, the participant's information was not shared, and the code name Ayşe was used. In addition, the student's parent was interviewed about the research content. The parent allowed her to participate in the research with the thought that her mathematics skills would improve. In this context, the parent filled the Parent Permission Form prepared by the researchers, and the action plans were prepared.

Action plan

Action research is carried out in a cyclical pattern to collect information about the problem, search for resources, and develop and improve with problem-solving actions (Mills, 2003). The research focused on Mills's (2003) action research cycle. The action plan in the research was designed to last seven weeks. First of all, problems and sub-problems were created with the literature review. In the first week of the research, the focus area was determined, data collection tools were prepared, and a pilot study was conducted.

Determining the Focus Area in the Action Plan

Case Studies on Ayşe's Difficulties in Subtraction

Ayşe's subtraction skill was included in the learning outcomes based on the individualized education plan, and it was thought she had problems with the subtraction process. From this point of view, the subtraction process was determined as the focus of the research. After determining the problems Ayşe experienced in subtraction, a list of prerequisite skills was prepared in the first stage, and the necessary skills for teaching were checked. Then, the subtraction skill was analyzed to prepare a teaching plan. Cawley, Hayes, and Foley's (2008) subtraction steps were used in the analysis. This was taken as an example because it ranks the stages in the subtraction skill from easy to difficult. At the same time, the analysis has guided the ranking of the instructions in the Criterion Dependent Tests. The analysis was determined to start with subtraction, which does not require decimal conversion, and teach from easy to difficult. Table 1 below includes Cawley et al.'s (2008) subtraction steps.

Table 1. Subtraction steps (Cawley et al., 2008)

Stage	Steps	Example
1	Subtracts a single-digit number from a single-digit number.	5-4
2	Subtracts a single-digit number from a two-digit number without decimal conversion.	26-3
3	Subtracts a two-digit number from a two-digit number without decimal conversion.	45-32

Ayşe's problem was decided, and her performance was measured. Based on her performance, data collection tools to be used in the action plan were created. How the data collection tools for the action plan were prepared and for what purpose they were used are explained in detail in Table 2 below.

Data Collection Tools Used in the Action Plan

Action research is a systematic process. In action research, the collection of data from many sources enables one to look at the data from different perspectives and strengthens the effect of the research. Systematically collected data are analyzed throughout the research and guide action plans (Mills, 2003). In this study, more than one data collection tool was used for the reliability of the study. Pre- and post-tests (Criteria Dependent Tests), performance record tables and activity studies, diaries, and homework were used as data collection tools. Data collection tools and the reasons for their preference for the research are given in Table 2.

Table 2. Data Collection Tools Used in This Study and Reasons for Preference

Prerequisite	The practitioner researcher developed it to control the skills that the student needs to
Skills Checklist	know to learn the subtraction skill (Terzioğlu & Yıkmış, 2018). The suitability of this list was decided by looking at the student's skills and discussing the prerequisites for teaching subtraction skills with mathematics and special education teachers. The prerequisite skills in the checklist are given in Table 2.1.

Table 2.1. Prerequisite Skills for Subtraction Skill

1. Fulfills verbal instructions.
2. Does visual perception studies.
3. Does auditory perception studies.
4. Reads and writes numbers.
5. Says that 0 means absence.
6. Does forward rhythmic counting.
7. Does backward rhythmic counting.
8. Does the addition operation.

Criterion They are measurement tools developed by the practitioner researcher to determine the student's performance. **Criterion Dependent Tests** are prepared according to two different models. These are the single opportunity and multiple opportunity models. The multiple opportunity model was used in this research while evaluating the skills. This model consists of being a model, verbal hints, and independence. The steps of the skill analyzed are given to the student as instructions. In the multiple opportunity model, all the steps for the student to give correct answers are presented. Thus, if the student cannot do a step, they can do the next step, and the teacher will observe the student's behavior in detail (Varol, 2005). While creating the Criterion Dependent Tests for the research, the multiple opportunity approach was used because it allows the student to model and express the subtraction process in detail following verbal hints within the think-aloud method.

Two Criterion-Dependent Tests, in which different samples were presented, were created as pre-test and post-test. Before starting teaching, the Criterion Dependent Tests used in the pre-test were conducted to determine the student's think-aloud and subtraction skills. The Criterion Dependent Tests used in the post-test were prepared to evaluate the student's performance in the subtraction process at the end of the instruction. In developing the measurement tool, the researcher analyzed the subtraction skill, which does not require decimal conversion. The student's performance before the instruction was determined by the examples presented in the subtraction analysis. The Criterion Dependent Tests organized in the pre-test were turned into tables according to the statements, criteria to be applied (3/4), questions, and opportunities (physical help, modeling, verbal hint, and independence). The subtraction process was analyzed in 5 steps in the statements. The questions were presented with examples (11 questions) in 3 stages, with objects, pictures/shapes, and numbers according to each statement step. Then, in the post-test Criteria Dependent Test, the same analysis was presented with different samples selected in parallel with the questions in the pre-test. The measurement tools were sent to two experts in mathematics and two experts in special education. Their validity and reliability were checked, and it was decided to be applied (see Table 2.2. and 2.3).

Table 2.2. Subtraction Skills Question Examples in the Criterion Dependent Pre-Test Form

NOTIFICATIONS	CRITERION	QUESTIONS	PA	M.	VC	I.
3. He/she subtracts single-digit numbers from single-digit numbers without decimalization.	3/4	3.a) Do subtraction with objects, think aloud while doing.				
		$9-3=$ $7-5=$ $8-2=$ $6-5=$ $\begin{array}{r} 7 \\ - 3 \\ \hline \end{array}$ $\begin{array}{r} 6 \\ - 4 \\ \hline \end{array}$ $\begin{array}{r} 9 \\ - 2 \\ \hline \end{array}$ $\begin{array}{r} 8 \\ - 5 \\ \hline \end{array}$				

Table 2.3. Subtraction Skills Question Examples in the Criterion-Based Post-Test Form

NOTIFICATIONS	CRITERION	QUESTIONS	P.A	M	VC	I
3.)He/she subtracts single-digit numbers from single-digit numbers without decimalization.		3.)a)Do subtraction with objects, think aloud while doing. $8-3=$ $5-5=$ $5-1=$ $8-7=$ $\begin{array}{r} 7 & 8 & 4 & 6 \\ -1 & -2 & -3 & -5 \end{array}$				

Performance Record Tables, Activity Studies They are measurement tools developed by the practitioner researcher, who check whether the student's analyzed skill behaves following the think-aloud method at each step. The performance recording tables used during the teaching processes were prepared following the tips in the teaching and the think-aloud method statements. According to the steps analyzed in the skill of producing performance record tables (subtracting a single-digit number from a single-digit number without a decimal conversion, subtracting a single-digit number from a two-digit number without a decimal conversion, subtracting a two-digit number from a two-digit number without a decimal conversion), materials to be used in the teaching process, and according to the presentation (teaching processes with objects, pictures, and numbers), it was organized to cover 12 lesson hours. Instructed subtraction analysis was analyzed in four stages, each with objects, pictures, and fingers, respectively. Following the multiple opportunity approach, the records were marked according to the modeling, verbal hint, and independent stages. This hint was not included in the performance records because the student did not need the physical aid hint in the pre-test. Two special education and mathematics experts evaluated the registration tables and put them into practice. A total of 9 performance record tables were used. Activity studies include worksheets containing the subtraction skill prepared by the practitioner researcher and used together with the performance recording tables during the teaching process, sample photographs of the subtraction process with objects, subtraction samples made in the student's notebook, etc., are studied. The student's activities during the teaching were specially added to the research process to test the extraction process in terms of acquisition and permanence. These studies were used by the experts and educators who carried out the research with consensus.

Think-aloud Interview Form This form, developed by the practicing researcher, was used after the teaching sessions with the student and includes questions about the skill and method studied. While the interview questions were being developed, the practitioner researcher could not find student opinions in any study on the think-aloud method. In this study, this interview form was prepared to learn the student's attitude to the think-aloud method and provide self-evaluation of their learning. An expert evaluation form was created for the prepared interview form. Since the form was asked to measure the think-aloud method accurately and clearly, the questions were checked by a Turkish teacher. The interview questions were examined by the school guidance teacher, two experts in mathematics, and two special education experts, and their opinions were taken. After editing the interview questions, the application decision was made. As a result of the corrections and additions, the number of questions in the interview form was seven. Some of the questions in the interview form are given in Table 2.4.

Table 2.4. Think-Aloud Method Interview Form Question Examples

	<p>1) Do you think the think-aloud method is effective in learning subtraction? Can you explain why?</p> <p>2) Do you have a new concept or process that you learned with the think-aloud method? If yes, can you give an example?</p>
Diaries	During the implementation process, at the end of the teaching sessions, the practitioner researcher and the student explained the session's motivation, success, or failure by keeping a diary. The diaries were recorded in 2 notebooks: student and teacher diaries. The teacher kept a diary to explain the effects of the think-aloud method on the student and their planning. The purpose of the diaries attached to the student is to learn their thoughts and feelings about the think-aloud method and analyze the subtraction processes with Ayşe's expressions. Through checking the diaries, the practitioner researcher and researcher authors decided that the control of the diaries should be added to the research.
Homework	The activity work given to the student by the teacher during the application process is to be done at home. After the teaching sessions, the student was given homework for 5 weeks. It aims for the student to repeat the gained subtraction skill and do it independently. The study included homework control, checked by the mathematics and special education experts.
Audio Recordings and Video Recordings	These are recordings of the teaching sessions with the student from the beginning to the end of the implementation of the action plans. Considering that the method should analyze the audio data, the data were recorded during the individual interviews. Informal interviews were held with the student several times before the research to get used to being recorded with their permission.

After the data collection tools were prepared, a pilot study was included to be tested. The pilot study is detailed below.

Pilot Study

First of all, a pilot study was conducted for the measurement tools prepared for the think-aloud method. The necessary permissions were obtained from the student's parents who participated in the pilot study. The student participating in the pilot study was a male student with a mild intellectual disability who continues mainstream education in the eighth grade at the same school. The pilot student understands what she reads and, unlike Ayşe, has knowledge of subtraction but has difficulty in it. The pilot study was carried out for 1 week, 2 lesson hours per day. The application was carried out by choosing a stage where the pilot student had difficulty with subtraction skills. During the pilot study, the data collection tools to be carried out in the action plan were used respectively (Prerequisite skills list, Pre-test, Think-aloud method, teaching sessions together with performance record tables and activity studies, criterion-dependent test used for the post-test, and think-aloud interview form). At the end of the teaching process, it was observed that the student gained the ability to subtract with the think-aloud method and expressed their thinking processes independently. Based on this result, it was decided that the think-aloud method could be effective in the research. After the data collection tools were finalized with the pilot study, the research was conducted in 5 weeks. The implementation process of the action plan is given in detail below.

Action Plan Implementation Process

In this study, after the focus area was determined and the data collection tools were given their final shape, the researcher conducted an application for 5 weeks with Ayşe, who had a mild disability. In the first week of the application, Criterion Dependent Tests were prepared according to the extraction process analysis, and a pre-test was applied. In the pre-test, Ayşe did not know what subtraction meant, could tell the sign of subtraction with the help of verbal hints, and could not do subtraction with objects, pictures, and numbers. However, it has been observed that she can acquire the processing skill by being

a model. Table 3 below shows how the data collection tools were applied together with the pre-test and how this process took place, respectively.

Table 3. Implementation process

Applications by week

Week 1

Pre-test - Performing the Criterion Dependent Test.

Extracting single-digit numbers from single-digit numbers following the think-aloud method (Teaching sessions with objects - Teaching plan 1).

Making Performance Records.

Making performance records and activity studies.

Keeping a diary and assigning homework after teaching sessions.

Week 2

Extracting single-digit numbers from single-digit numbers following the think-aloud method (Teaching sessions with pictures - Teaching plan 2).

Extracting single-digit numbers from single-digit numbers following the think-aloud method (Teaching sessions with numbers-Teaching plan 3).

Making performance records and activity studies.

Keeping a diary and assigning homework after teaching sessions.

Week 3

Extracting single-digit numbers from two-digit numbers following the think-aloud method (Teaching sessions with objects - Teaching plan 4).

Extracting single-digit numbers from two-digit numbers following the think-aloud method (Teaching sessions with pictures - Teaching plan 5).

Extracting single-digit numbers from two-digit numbers following the think-aloud method (Teaching sessions with numbers - Teaching plan 6).

Making performance records and activity studies.

Keeping a diary and assigning homework after teaching sessions.

Week 4

Extracting two-digit numbers from two-digit numbers following the think-aloud method (Teaching sessions with objects - Teaching plan 7).

Extracting two-digit numbers from two-digit numbers following the think-aloud method (Teaching sessions with pictures - Teaching plan 8).

Extracting two-digit numbers from two-digit numbers following the think-aloud method (Teaching sessions with numbers - Teaching plan 9).

Making performance records and activity studies.

Keeping a diary and assigning homework after teaching sessions.

Week 5

Post-Test- Implementation of Criterion Dependent Test.

Implementation of the think-aloud method interview form.

When the implementation process is examined in Table 3, the Pre-test and Criterion Dependent Test was applied to measure Ayşe's knowledge about subtraction in the first week of the teaching sessions. The pre-test was carried out within 2 class hours. Performance record tables were created starting from modeling, the skill level that the student needs. Lesson plans were prepared and implemented following the think-aloud method. It is thought that the teaching plans prepared according to multiple opportunities and appealing to multiple senses will be effective in the acquisition and permanence of the subtraction skill.

First of all, Ayşe was interviewed and asked how she could do the subtraction process more easily, and it was stated that she could think aloud to enable her to follow her own instructions. The student was informed about the think-aloud method and modeled the subtraction of single-digit numbers from single-digit numbers with the think-aloud method. Then teaching sessions, which are independent applications, were carried out. Think-aloud teaching sessions were organized as 10-minute teaching sessions, 1 lesson per day.

The Operation of the Think-aloud Method Application Process:

The practice of the think-aloud method consists of two stages: doing the think-aloud training in the first stage and applying it in the second stage. The think-aloud education process is carried out individually with the student in three stages (Özkubat & Özmen, 2018; Sweeney, 2010):

1. The practitioner explained the purpose of the study. It was stated that with the think-aloud process, the student could better understand the subtraction skill by controlling themselves and was informed of the target that they could learn.
2. The subtraction skill is modeled on the example. In this process, the practitioner exhibited self-questioning, self-direction, self-monitoring, and thinking out loud behaviors at every step.
3. The practicing researcher asked the student a question different from the examples used and asked the student to think these problems aloud. He repeated the process for the second sample of subtraction. After the think-aloud method training, the application phase began. The practitioner asked her to do the subtraction by thinking aloud as in the training process. The application was also applied for operations and activities with three different difficulty levels.

At the next stage of the application, the examples on the activity sheet were presented to the student. The student's answers were marked on the measurement tool (Performance Record Tables). Lessons were held for 5 hours a week, 1 hour each day. Teaching sessions were 10 minutes each, and at the end of the lesson, the student and teacher kept diaries. Homework was given to the student to repeat the outcome. The plans, teaching sessions, and activities were arranged according to the analysis of the subtraction process. The mathematics lesson was carried out by the experts who carried out the study together during the application. The diaries and assignments recorded after the lectures and sessions were shared with the experts. Evaluations were taken into account, and the following week's lessons were planned. An example of how the process is implemented is given in Appendix 1. The functioning of the teaching plans used in the teaching sessions is given in Table 4 below.

Table 4. Operation of the Plans Used in the Teaching Sessions

Instructional plans

Teaching Plan 1.

Statements of the analysis of subtracting single-digit numbers from single-digit numbers are structured according to the stages of modeling with objects and independent applications. According to the think-aloud method, the model stage was carried out by being a model for the student first, and verbal hint support was given to the operations that the student could not do in the following sessions. Teaching sessions continued until they could do it independently. Sessions were recorded with performance record tables. The number of sessions has been increased according to the student's performance. Since the first session with objects includes concrete operations, and the stage of acquiring the skill requires more repetition, 24 sessions are included in the operation of this lesson plan. After the student performed the teaching sessions independently, at least three independent practice criteria sessions were carried out to move to another skill stage. The subtraction sessions with pictures were started. Homework was given by keeping student and teacher diaries. An example of how these teaching sessions with objects are done is given in Appendix 2.

Teaching plan 2.

Performance record tables were structured according to subtracting single-digit numbers from single-digit numbers, modeling with pictures or figures, and independent applications. After the think-aloud modeling sessions, the student was expected to independently perform the subtraction skill by thinking aloud in the teaching sessions. After the modeling phase, verbal hint support was given in the sessions to help the student think aloud. Teaching sessions continued until the skill was achieved independently. Transitioning from teaching sessions to other skills was carried out in at least three independent practice sessions. The activities organized with pictures were carried out in 12 sessions, and then the teaching with numbers sessions started. An example of a plan made with pictures or figures is given in Appendix 3. At the end of the teaching session, the practitioner researcher and Ayşe kept a diary. In addition, Ayşe was given homework to repeat the outcome.

Teaching Plan 3.

As stated in Appendix 4, subtracting single-digit numbers from single-digit numbers was carried out according to the stages of finger modeling and independent applications. The subtraction of numbers and single-digit numbers, which does not require decimal conversion, is marked in the performance record table as a total of 9 sessions. Modeling, verbal assistance when necessary, and independent practices were carried out. After three independent practice sessions, operations were performed using fingers. Ayşe and the practitioner researcher kept a diary after the daily sessions. The practicing researcher gave homework to the student to repeat the outcome.

Teaching Plan 4-5-6.

The teaching sessions of subtracting one-digit numbers from two-digit numbers were carried out using objects, pictures, and fingers, using performance recording tables according to the think-aloud method from concrete to abstract. After three independent practice sessions, the session was terminated. A total of 27 teaching sessions were held with each step of the learning outcome. After the sessions, Ayşe and the practitioner researcher kept a diary. Assignments have been given.

Teaching plan 7-8-9.

Sessions for subtracting two-digit numbers from two-digit numbers were also carried out with performance recording tables according to the think-aloud method using objects, pictures, and fingers from concrete to abstract. The hint processes given while Ayşe was doing the subtraction were withdrawn, and the sessions were terminated after three consecutive independent practice sessions. A total of 34 teaching sessions were held. After the sessions, Ayşe was assigned homework by keeping a diary.

Post-Test Implementation of the Criterion-Based Test

At the end of the teaching sessions, the Criterion Dependent Post-Test was removed in the fifth week, with different samples. The final test was done within 2 class hours. The Criterion Dependent Test was also arranged following the multiple opportunity approach, and evaluation sessions were organized for the student to make subtraction with the think-aloud method without intervention. Two researchers with audio recordings checked the evaluations. The researchers examined the result of the evaluations. In the fifth week of the study, it was observed that the student was able to perform subtraction that does not require decimal conversion independently. Interviews were conducted to exemplify how the student did the think-aloud method with her own words and to get her feelings and thoughts about doing the subtraction with the think-aloud method.

Conducting a Student Interview about the Think-aloud Method

After the teaching and evaluation sessions, Ayşe was interviewed about the process. The think-aloud interview form was filled in by the practitioner researcher with the student's recorded answers. The interview process took approximately 20 minutes. For the student to understand and feel comfortable with the interview questions, additional questions and explanations (Do you feel comfortable? Are you satisfied with the environment you are in for the interview? If there is something you do not understand in the questions, you can easily say it) were sought. Two special education and mathematics experts checked the student's thoughts about the think-aloud method and what she

understood from the subtraction skill. After the interview, the data collected in the process were analyzed.

Analysis of Data Collection Tools Used in the Action Plan

The data collected in the seventh week of the study were analyzed. In this study, the data were analyzed in three stages according to the steps in the extraction process analysis. In the data analysis emerging in the research, descriptive analysis, one of the qualitative data analyses, was used. This approach includes direct quotations and detailed descriptions of the process in observations and interviews (Yıldırım & Şimşek, 2016). The main analysis in the extraction process was determined as themes, and their analyses were presented separately. Information on how the data collection tools were analyzed is presented in Table 5 below.

Table 5. Data Collection Tools Analysis

Prerequisite Skills Checklist	Prerequisite skills were analyzed by checking with the prepared activity study. It was seen that the sample questions and instructions presented in the activity met the $\frac{3}{4}$ criterion. The researchers checked the effectiveness of the study, and it was concluded that the criterion was sufficient.
Criterion Dependent Tests	Criterion Dependent Tests were analyzed separately as a table in the findings as pre-test and post-test. Multiple opportunity approach tips are included in the table arranged following the statements and teaching activities given in criterion-dependent tests. According to the practice step marked at each step, what stage of the skill Ayşe was at or if she performed the skill independently were concluded. The tests were analyzed with the coder reliability of two experts.
Performance Record Tables and Activity Studies	Performance records made during the process were analyzed and interpreted with graphics. The graphs were prepared according to the number of lecture sessions held and in which sessions the multiple opportunity approach steps were performed. Performance record tables were coded and graphed by two experts. The agreement between coding was calculated using Miles and Huberman's (1994) percent agreement, and a full agreement (100%) was achieved. Activity studies are examples of questions used with performance recordings, and their analysis was analyzed based on the $\frac{3}{4}$ accuracy criterion of the coders. The instruction step was marked and placed in the charts after identifying which step it belonged to among the multiple opportunity steps.
Think-Aloud Interview Form	In the data obtained from the interviews with Ayşe, the researchers extracted codes through content analysis. The main purpose of content analysis is to find the concepts and relationships that explain the data (Yıldırım & Şimşek, 2016). In this data collection tool, Ayşe's views on the think-aloud method were conceptualized and arranged logically, and themes explaining the data were revealed.
Diaries	Student and teacher diaries were subjected to coder reliability by two experts. Examples and direct quotations about the student's performance in the think-aloud method were included in the findings.
Homework	Assignments were subjected to effectiveness analysis by two experts. This way, coder reliability is ensured. Examining the homework and feedback on it are also included.
Audio Recordings and Video Recordings	The audio recordings used during the research were analyzed with descriptive analysis. Direct quotations from the interviews in the teaching sessions are included. Interviews and sessions were recorded and systematized.

The Role of the Researcher

In action research, the researcher can assume multiple roles such as data collection, application, and reporting (Yıldırım & Şimşek, 2016). The fact that action research is systematic and the data collected is more than one will affect the validity and reliability of the research. The practicing researcher participated in multiple stages: identifying the student's problem area, collecting data, developing scales, implementing action plans, and analyzing data. Conducting the research as collaborative action research and analyzing the teaching and evaluation process from different perspectives positively affected the objectivity of the research. In addition, since two of the authors of this study are experts in mathematics, it has benefited the practitioner researcher in the correct conduct of mathematics teaching. The measurement tools control was provided by the researcher and the special education and mathematics teachers, who are experts in the field. It was assumed that the teaching was tailored to the student, and the right decision was made in the method choice since the practicing researcher was also the student's teacher and had observed the student's performance for over a year. The researcher being a teacher in the student's school facilitated the research process in terms of communication with parents, teachers, and permission. During the research, teaching sessions were held individually with the student in the school's special education classroom and sometimes in another designated classroom. The environment is free from striking physical stimuli. The tools and materials to be used before the teaching were made ready. However, it was observed that Ayşe adapted to the process correctly in the study and gave sincere answers in the interviews.

Results

In this section, the findings obtained in teaching the subtraction skill with the think-aloud method to a student with mild intellectual disability are presented in tables and figures in line with the determined subtraction skill teaching application stages. Data obtained from audio recordings, diaries, activity studies, and homework were also included in the teaching process of subtraction skills.

1- Findings on the student's performance in the pre-test

A criterion-dependent measure tool was used as a pre-test in the pre-interview with the student. The data on the student's performance in the pre-test is given in Table 6 below.

Table 6. Data on the Performance of the Student in the Pretest-Criteria-Based Test

Instructions	Guidelines	Physical Assistance	Modeling	Verbal Hint	Independent
Tells the meaning of subtraction.	Tell.		X		
Distinguish the symbol of subtraction.	Show. Tell.			X	X
Subtracts single-digit numbers from single-digit numbers without decimal conversion.	Do it with the object. Do it with a picture/shape. Do it with numbers.		X X X		
Subtracts single-digit numbers from two-digit numbers without decimal conversion.	Do it with the object. Do it with a picture/shape. Do it with numbers.		X X X		
Subtracts two-digit numbers from two-digit numbers without decimal conversion.	Do it with the object. Do it with a picture/shape. Do it with numbers.		X X X		

When the data in Table 6 is examined, it is seen that Ayşe fulfills the statements as the teacher is a model. An example of subtracting single-digit numbers from two-digit numbers made with pictures and figures in the pre-test is given in Figure 1 below.

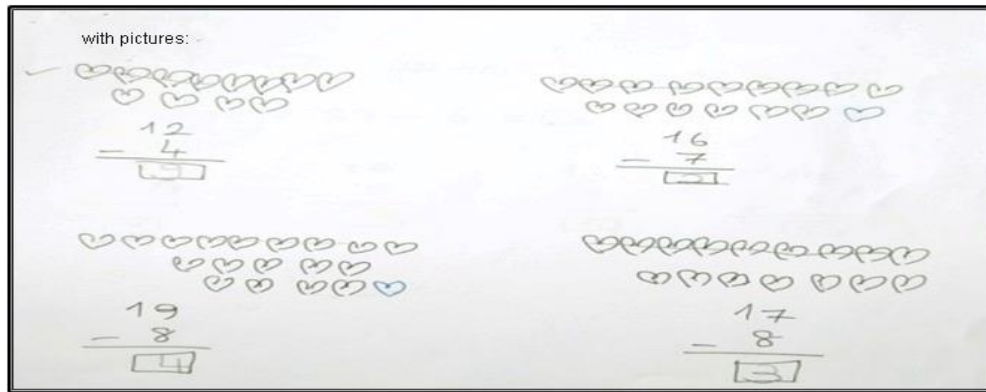


Figure 1. Examples of the student's answers to the process of subtracting single-digit numbers from two-digit numbers made with pictures and figures in the pre-test

When Figure 1 is examined, it is seen that the student does the four subtraction operations by drawing shapes. The application process includes teaching the skill of subtracting single-digit numbers from single-digit numbers without decimal conversion, teaching the skill of subtracting single-digit numbers from two-digit numbers without requiring decimal conversion, and teaching the skill of subtracting two-digit numbers from two-digit numbers without requiring decimal conversion. According to the student's performance, the data obtained in each teaching session for the teachings are being a model, verbal expression, and independence. In the collected data, no data could be obtained from the student for the physical aid step, and since this step was included in the pre-test, the physical assistance step is included in the graphics.

2- Findings of the Process of Teaching the Skill of Subtracting Single-Digit Numbers from Single-Digit Numbers with Objects Arranged According to the Think-aloud Method without Decimal Conversion

The sessions held in teaching the skill of subtracting single-digit numbers from single-digit numbers with objects without requiring decimal conversion and the multiple opportunity performance levels of the student's think-aloud method are given in Figure 2 below.

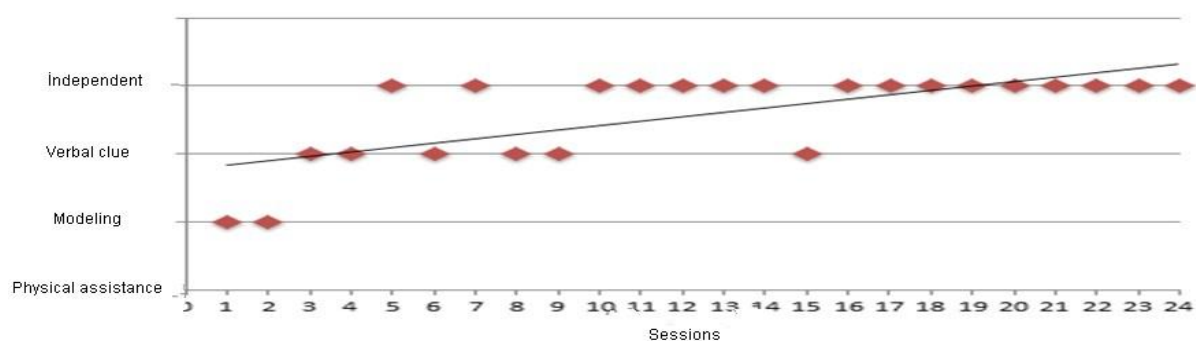


Figure 2. Stacked Dot Graph of Ayşe's Multiple Opportunity Performance Levels of the Think-aloud Method in Sessions and Sessions Held in the Process of Teaching the Skill of Subtracting Single-Digit Numbers from Single-Digit Numbers without Decimal Conversion with Objects

When Figure 2 is examined, it is seen that there were 24 sessions using objects in the process of teaching the skill of subtracting single-digit numbers from single-digit numbers without decimal conversion. It is seen that in the first and second sessions, Ayşe performed the subtraction skill with the teacher being a model. After the sixteenth session, she independently performed the skill of subtracting single-digit numbers from single-digit numbers without requiring decimal conversion. Examples of Ayşe's answers in the activity papers in the first, fourth, and sixteenth sessions of teaching subtracting single-digit numbers from single-digit numbers without decimal conversion are given in Figure 3 below.

$4-4=0$	$9-1=8$	$6-2=4$
$8-3=5$	$6-3=3$	$4-0=4$
$7-3=4$	$9-2=7$	$9-6=3$
$5-0=5$	$5-0=5$	$6-4=2$

Figure 3. Examples of Ayşe's ability to subtract single-digit numbers from single-digit numbers without decimal conversion taught in 1st, 4th, and 16th sessions.

As seen in Figure 3, Ayşe answered the questions about the subtraction correctly. The expressions in Ayşe's diary of the 24th teaching session on teaching the skill of subtracting single-digit numbers from single-digit numbers without decimal conversion are given in Figure 4 below.

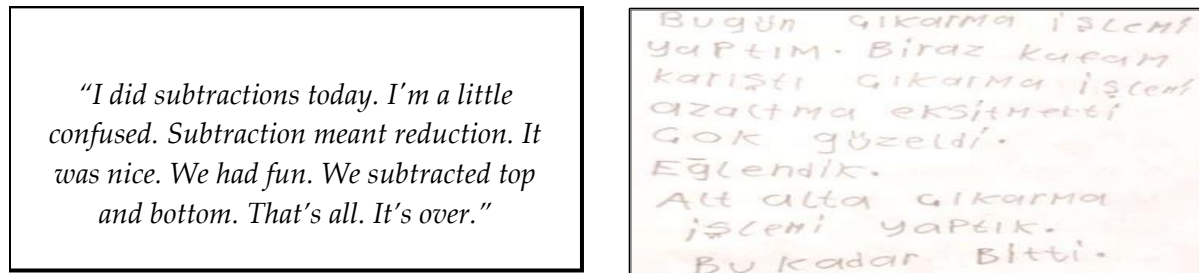


Figure 4. The statement about the 24th teaching session in Ayşe's diary

When Figure 4 is examined, the expressions "...I did" and "...we did" used by the student show that the student uses the applied think-aloud method and is memorable. In addition, considering the student expressions in Figure 4, it is seen that the student finds the teaching sessions conducted with the think-aloud method entertaining.

3- Findings of the Process of Teaching the Skill of Subtracting Single-Digit Numbers from Single-Digit Numbers without Decimal Conversion with Pictures and Figures Arranged According to the Think-aloud Method

The sessions held in teaching the skill of subtracting single-digit numbers from single-digit numbers with pictures and figures without requiring decimal conversion and the multiple opportunity performance levels of the student's think-aloud method are given in Figure 5 below.

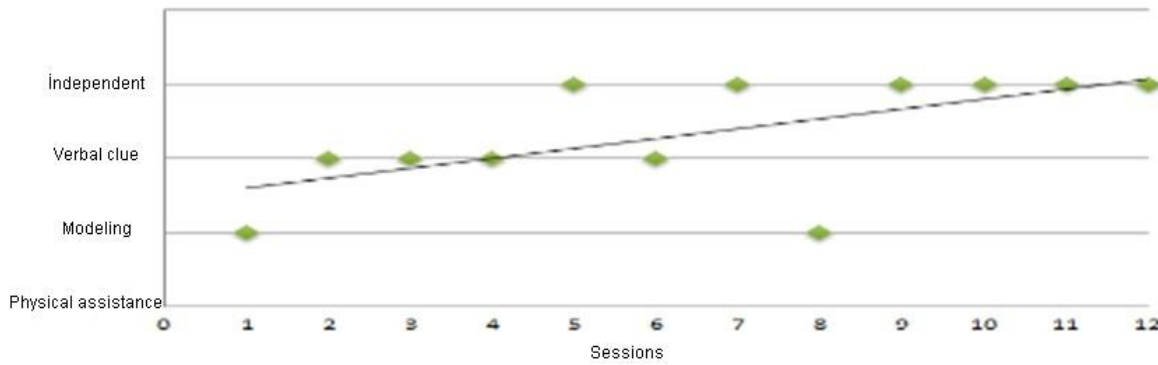


Figure 5. Stacked Point Graph of the Multiple Opportunity Performance Levels of the Students Think-aloud in the Sessions and Sessions Carried Out in the Process of Teaching Subtracting Single-Digit Numbers from Single-Digit Numbers without Decimal Conversion with Picture/shapes

When the graph in Figure 5 is examined, it is seen that there were 12 sessions in which the student was taught the skill of subtracting single-digit numbers from single-digit numbers without decimal conversion, using pictures and figures. While the student performed the subtraction skill in the first session with the teacher being a model, it was seen that she performed it with the verbal hint given by the teacher in the second, third, and fourth sessions. Additionally, in the fifth session, while the student performed the subtraction skill independently, in the sixth session, she could not. In the sixth session, she performed the subtraction skill with the verbal hint given by the teacher. Likewise, the student performed the subtraction skill independently in the seventh session. In contrast, the teacher was a model in the eighth session, as shown in Figure 5. In the last four sessions, the student performed the subtraction skill independently. Figure 6 shows the student's written explanation in her diary regarding the fourth session of teaching the skill of subtracting single-digit numbers from single-digit numbers without requiring decimal conversion using pictures and figures.

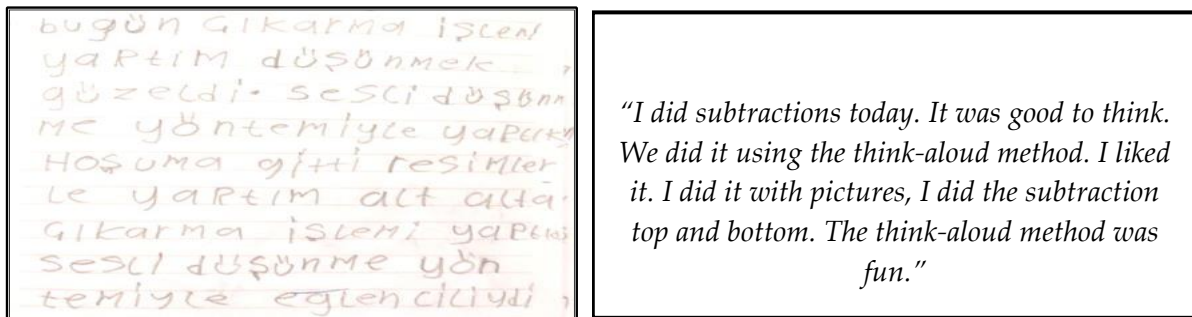


Figure 6. The statement about the sixth teaching session in Ayşe's diary

When Ayşe's opinion in Figure 6 is examined, it is understood that the student liked the think-aloud method and found it fun.

4- Findings of the Process of Teaching Subtracting Single-Digit Numbers from Single-Digit Numbers Arranged According to the Think-aloud Method without Decimal Conversion

The sessions held in teaching subtracting single-digit numbers from single-digit numbers without decimal conversion and the multiple opportunity performance levels of the student's think-aloud method are given in Figure 7 below.

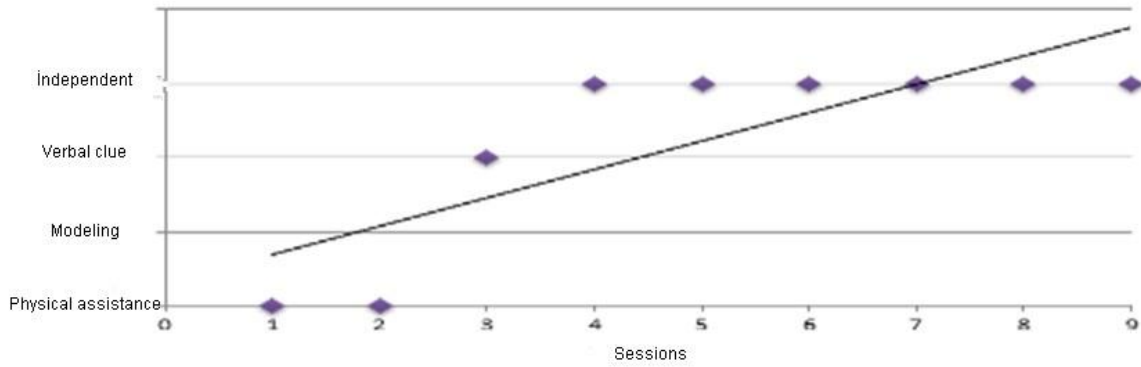


Figure 7. Stacked Dot Graph of Ayşe's Multiple Opportunity Performance Levels of the Think-aloud Method in Sessions and Sessions Held in the Process of Teaching Subtracting Single-Digit Numbers from Single-Digit Numbers Without Decimal Conversion

When the graph in Figure 7 is examined, it is seen that Ayşe performed the skill of subtracting single-digit numbers from single-digit numbers without the need for decimal conversion, with the teacher being a model in the first two sessions. In contrast, she performed subtraction with the teacher's verbal hints in the third session. From the fourth session until the last session, it is seen that the student independently performed the skill of subtracting single-digit numbers from single-digit numbers without requiring decimal conversion. It can be said that Ayşe's ability to subtract single-digit numbers from single-digit numbers without decimal conversion using the think-aloud method started at the modeling stage and ended when the student performed this skill independently for six sessions. In addition, Ayşe's written explanation for the 3rd session in her diary is given in Figure 8 below.

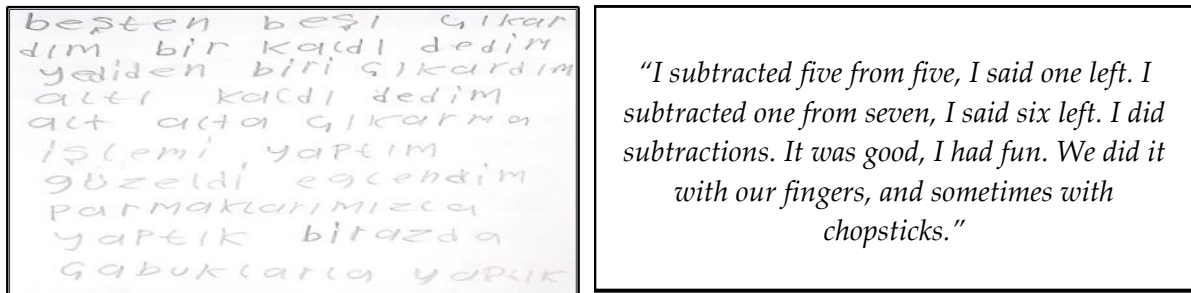


Figure 8. The statement about the third teaching session in Ayşe's diary

When Figure 8 is examined, it can be said that Ayşe expressed how she did the subtraction and found the session fun while doing the operations. The dialogue obtained from the audio recording of the 3rd session in the process of teaching subtracting single-digit numbers from single-digit numbers without decimal conversion is as follows:

Teacher: Ayşe, what will you do now?

Ayşe: Subtraction.

Teacher: So, what does subtraction mean?

Ayşe: Reduction, lowering.

Teacher: How did you know that the operation is subtraction?

Ayşe: Minus.

Teacher: You saw the minus sign and said, this is subtraction. Because the symbol for subtraction is the minus sign, right? Now think out loud and subtract, okay? Tell me how you are going to do it

Ayşe: I will use nine fingers.

Teacher: Are you ready?

Ayşe: Yes. We'll take out six of them.

Teacher: You're going to think backward while doing this, right?

Ayşe: Yes. First, nine is in my mind.

Teacher: Yes, you count backward.

Ayşe: Eight, seven...

Teacher: Yes.

Ayşe: Six, five...

Teacher: Yes.

Ayşe: Four, three.

Teacher: Three. Let's see if you took away six? You took out two, four, and six; how many are left?

Ayşe: Two.

Teacher: Let's see.

Ayşe: One, two, three.

Teacher: What did you subtract from nine?

Ayşe: Three.

Teacher: What did you subtract from nine?

Ayşe: One, two, three, four, five, six.

Teacher: You subtracted six; how much is left?

Ayşe: Three.

Teacher: Three left, right? Shall we look again? Let's not get confused.

Ayşe: Yes.

Teacher: Open your hands. You subtracted six out of nine again, didn't you? How many are left?

Ayşe: Three.

Teacher: Then how many fingers are left after removing six out of nine?

Ayşe: Three.

Teacher: It's three, isn't it? You did it by counting backward. Let's do it again without using our fingers. Keep nine in mind.

Ayşe: Eight, seven, six, five, four, three.

Teacher: How many are left?

Ayşe: Three.

Teacher: What is left when you subtract six from nine?

Ayşe: Three.

Teacher: You can write the answer, Ayşe."

The dialogue obtained from the audio-recorded sessions with Ayşe from the 9th teaching session with numbers when teaching subtracting single-digit numbers from single-digit numbers without decimal conversion is given below:

"...Ayşe: I will subtract three from six. I saw the minus sign. The minus sign meant reducing and lowering. I'll subtract three from six. I have six in mind. I take away three fingers. I say six, five, four, three.

Teacher: You counted backward, didn't you?

Ayşe: Yes.

Teacher: What was the answer?

Ayşe: Three."

When the dialogue in the 3rd and 9th sessions, in which the skill of subtracting single-digit numbers from single-digit numbers without decimal conversion is taught, is examined, it can be said that the student primarily performs the subtraction skill by using her fingers and then completely performs subtraction with numbers.

5- Findings of the Process of Teaching Subtracting Single-Digit Numbers from Two-Digit Numbers with Objects Arranged According to the Think-aloud Method without Decimal Conversion

The sessions held in teaching subtracting single-digit numbers from two-digit numbers with objects without decimal conversion and the multiple opportunity performance levels of the student's think-aloud method are given in Figure 9 below.

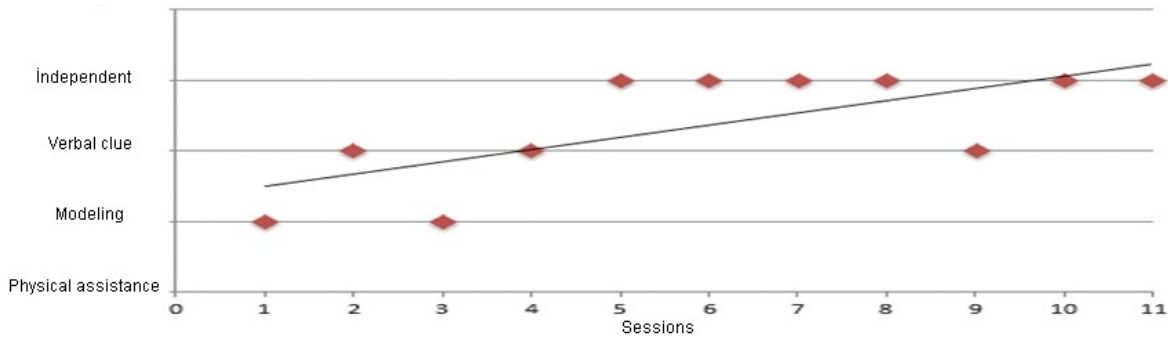


Figure 9. Stacked Dot Graph of Ayşe's Multiple Opportunity Performance Levels of the Think-aloud Method in Sessions and Sessions During the Process of Teaching Subtracting Single-Digit Numbers from Two-Digit Numbers without Decimal Conversion with Objects

When Figure 9 is examined, it is seen that there were 11 sessions with the student using objects in the process of teaching subtracting single-digit numbers from two-digit numbers without decimal conversion. Figure 10 below shows that in the teaching sessions with objects according to the think-aloud method, the student performed the subtraction skill in the first and third sessions, with the teacher being a model. In contrast, she performed subtraction through the teacher's verbal hints in the second, fourth, and ninth sessions. It is seen that the student independently performed subtracting single-digit numbers from two-digit numbers without requiring decimal conversion in six of the last seven sessions.

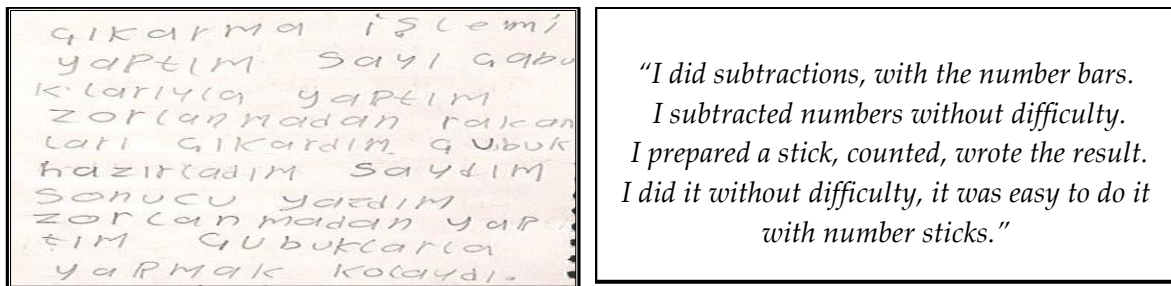


Figure 10. The statement about the eighth teaching session in Ayşe's diary

When Figure 10 was examined, it was seen that Ayşe stated that she did not have any difficulties while performing the subtraction skill.

6- Findings of the Process of Teaching Subtracting Single-Digit Numbers from Two-Digit Numbers without Decimal Conversion with Pictures and Figures Arranged According to the Think-aloud Method

The sessions held in teaching subtracting single-digit numbers from two-digit numbers with pictures and figures without decimal conversion and the multiple opportunity performance levels of the student's think-aloud method are given in Figure 11 below.

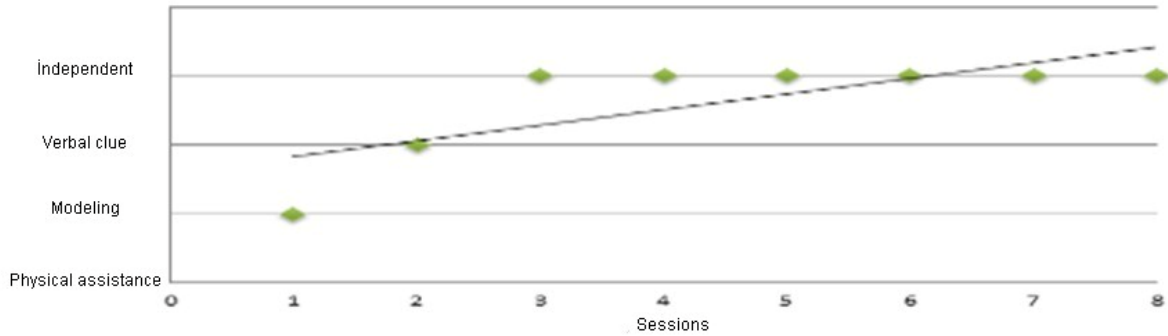


Figure 11. Stacked Point Graph of the Multiple Opportunity Performance Levels of the Student's Think-aloud Method in the Sessions and Sessions Held in the Process of Teaching Subtracting Single-Digit Numbers from Two-Digit Numbers Without Decimal Conversion with Picture/shapes

When the graph in Figure 11 is examined, it is seen that there were 8 sessions in which the student was taught the skill of subtracting single-digit numbers from two-digit numbers without decimal conversion, using pictures and figures. It is seen that in the first session, Ayşe performed the subtracting single-digit numbers from two-digit numbers without decimal conversion with the teacher being a model. In contrast, she performed the skill in the second session with the teacher's verbal hints. It can be said that from the third session to the eighth session, Ayşe independently performed subtracting single-digit numbers from two-digit numbers without decimal conversion. The teacher's written explanation for the fifth session in his diary is given in Figure 12 below.

ledim. Genel olarak tek basamaklı sayılardan tek basamaklı sayıyı çıkarma işlemini yapabildiğini düşünüyorum. Bu yüzden resimlerle çıkarma işlevine geçtim. Model olarak parçektirildim ilk oturumda sonra, başı- sız bir şekilde yapmayı için bir oturum parçektirdim. Bazı ara- ları atlayarak işlevi yaptım. S.İ. basamaklı parçektirdim ve bir süre bu şekilde işlevlere devam ettim. Daha sonra, başı- sız öğretim oturum- satı içinde daha doğru bir şekilde yaptığı işlevleri. Sesli bir şekilde düşünerek çıkarma işlemini yapıyordu.

"I think that the student can generally subtract from a single-digit number using a single-digit number. That's why I went to the stage of doing subtractions with pictures in the plan. After the first teaching session, which I held as a model, I conducted another session to independently achieve the outcome. When doing transactions by skipping some stages, I went back to the step of Verbal Clue and continued the transactions like this for a while. He then did it correctly within the time of the independent teaching session. He was doing subtractions by having fun and thinking about the transactions out loud."

Figure 12. The statement about the fifth session in the teacher's diary

When Figure 12 is examined, it can be said that in the fifth session with verbal hints and without being a model, the teacher thought that Ayşe did the subtraction lovingly and by understanding it. Additionally, the dialogue obtained from the audio recording of the sixth session, performed with

numbers in the process of teaching subtracting single-digit numbers from two-digit numbers without decimal conversion, is given below:

“...Ayşe: I will subtract eight from 16.

Teacher: Yes.

Ayşe: I saw the minus sign. The minus sign meant reducing and lowering. I'm making sixteen sticks. I made one, two, three, four, five, six, seven, eight, nine, ten, eleven, twelve, thirteen, fourteen, fifteen, sixteen, sixteen sticks. I'm taking out eight of them. One, two, three, four, five, six, seven, eight. I took out eight. I count the rest. One, two, three, four, five, six, seven, eight.

Teacher: Eight out of 16, how much is left?

Ayşe: Eight left.

Teacher: Yes, we continue...”

As it can be understood from the interview above, it is seen that Ayşe did the 16-8 operation correctly.

7- Findings of the Process of Teaching Subtracting Single-Digit Numbers from Two-Digit Numbers with Numbers Arranged According to the Think-aloud Method without Decimal Conversion

The sessions held in teaching the skill of subtracting single-digit numbers from two-digit numbers without decimal conversion and the multiple opportunity performance levels of the student's think-aloud method are given in Figure 13 below.

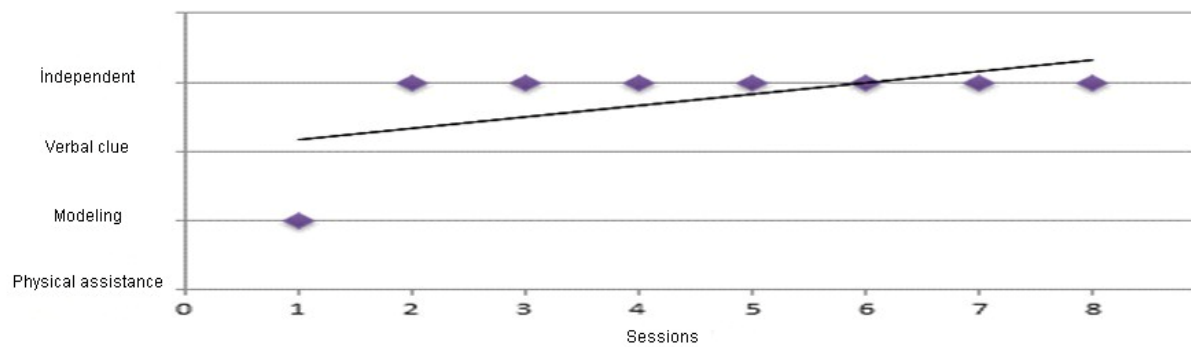


Figure 13. Stacked Dot Graph of Ayşe's Multiple Opportunity Performance Levels of the Think-aloud Method in Sessions and Sessions Held in the Process of Teaching Subtracting Single-Digit Numbers from Two-Digit Numbers Without Decimal Conversion

When Figure 13 is examined, according to the think-aloud method, in the first session, Ayşe performed subtracting single-digit numbers from two-digit numbers without decimals conversion, with the teacher being a model. She performed this skill independently in all sessions after the first session. Related to this, examples of the questions in the activity sheet and homework in the eighth session are given in Figure 14 below.

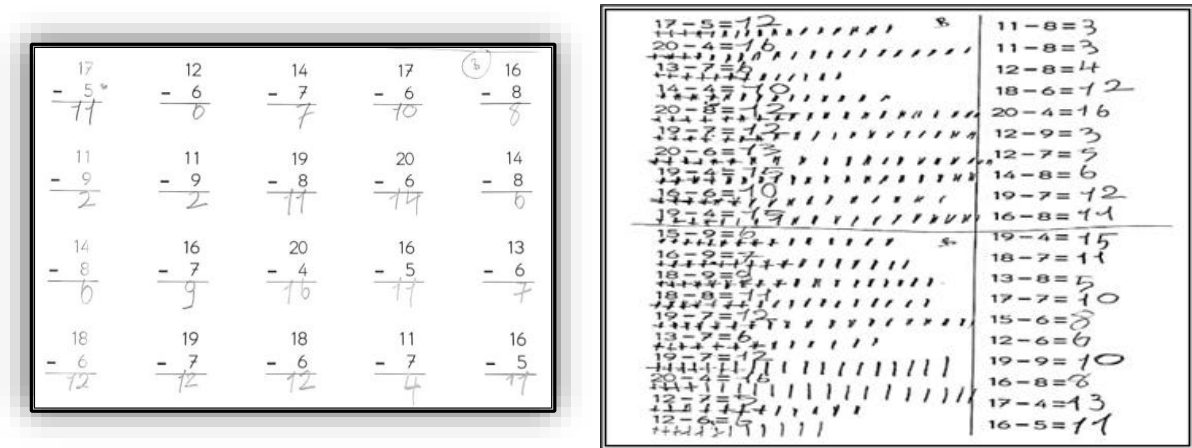


Figure 14. Two examples from the activity sheet and homework that Ayşe did in the eighth teaching session

When Figure 14 is examined, Ayşe’s answers are included. It is seen that Ayşe did the subtraction correctly in the activity sheet and the homework.

8- Findings of the Process of Teaching Subtracting Two-Digit Numbers from Two-Digit Numbers Without Decimal Conversion with Objects Arranged According to the Think-aloud Method

The sessions held in teaching subtraction of two-digit numbers from two-digit numbers with objects without decimal conversion and the multiple opportunity performance levels of the student’s think-aloud method are given in Figure 15 below.

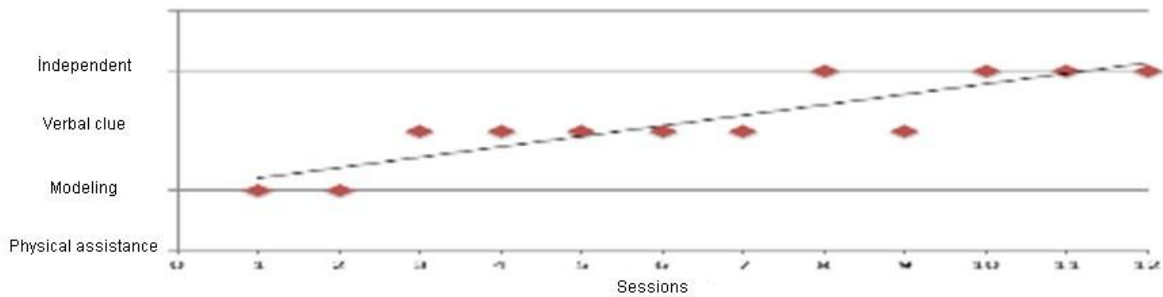


Figure 15. Stacked Dot Graph of Ayşe’s Multiple Opportunity Performance Levels of the Think-aloud Method in Sessions and Sessions in the Process of Teaching Subtracting Two-Digit Numbers from Two-Digit Numbers without Decimal Conversion with Objects

As seen in Figure 15, in the first and second sessions designed with objects according to the think-aloud method, Ayşe performed the skill of subtracting two-digit numbers from two-digit numbers without decimal conversion, with the teacher being a model. In contrast, she completed these subtractions using verbal hints between the third and seventh teaching sessions. Ayşe, who performed independently in the eighth session, completed the session with the support of verbal hints in the ninth session and independently performed at three consecutive sessions in the subsequent sessions. Related to this, examples of the questions in the activity sheet in the tenth teaching session are given in Figure 16 below.

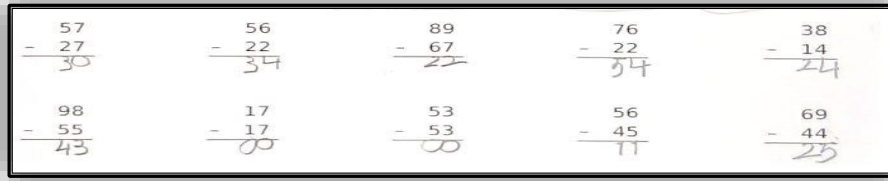


Figure 16. Example from Ayşe’s activity sheet made in the 10th teaching session

When Figure 16 is examined, the operations performed by the student for subtracting a one-digit number from 10 two-digit numbers that do not require decimal conversion can be seen.

9- Findings of the Process of Teaching Subtracting Two-Digital Numbers from Two-Digit Numbers Without Decimal Conversion with Pictures/Shapes Arranged According to the Think-aloud Method

Teaching the skill of subtracting two-digit numbers from two-digit numbers with pictures/shapes without decimal conversion carried out in 10 sessions and the multiple opportunity performance levels of the student’s think-aloud method are given in Figure 17 below.

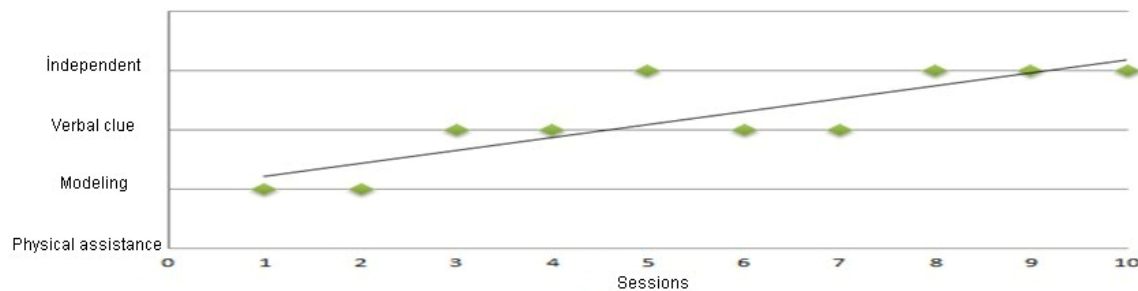


Figure 17. Stacked Dot Graph of Ayşe’s Multiple Opportunity Performance Levels of the Think-aloud Method in Sessions and Sessions in the Process of Teaching Subtracting Two-Digit Numbers from Two-Digit Numbers without Decimal Conversion with Picture/shapes

When Figure 17 is examined, in the first and second sessions with picture/shapes according to the think-aloud method, the student performed the skill of subtracting two-digit numbers from two-digit numbers without decimal conversion with the teacher being a model. In contrast, she completed the subtraction using verbal hints in the third and fourth sessions. At the same time, it is seen that she completed the teaching with verbal hints in the sixth and seventh sessions, which she did independently in the fifth session. It was observed that Ayşe performed independently in three consecutive sessions between the eighth and tenth teaching sessions. Examples of the questions in the activity sheet in the tenth teaching session are given in Figure 18 below.

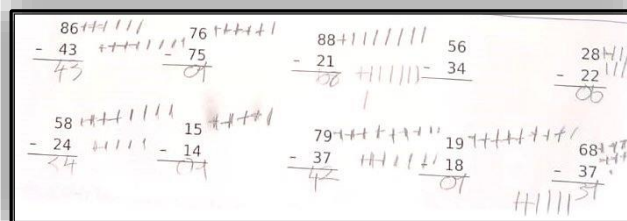


Figure 18. Examples from Ayşe’s activity sheet made in the 10th teaching session

When Figure 18 is examined, it is seen that the operations for subtracting two-digit numbers from ten two-digit numbers are done with the help of a stick, nine operations are performed, and one operation is not.

10- Findings of the Process of Teaching Subtracting Two-Digital Numbers from Two-Digital Numbers without Decimal Conversion with Numbers Arranged According to the Think-aloud Method

The twelve sessions conducted in teaching subtraction from two-digit numbers to two-digit numbers without decimal conversion with numbers and the multiple opportunity performance levels of the student's think-aloud method are given in Figure 19 below.

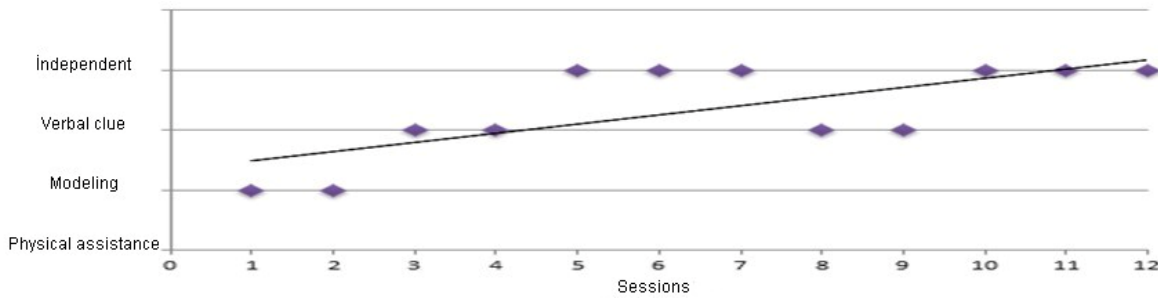


Figure 19. Stacked Dot Graph of Ayşe's Multiple Opportunity Performance Levels of Think-aloud Method in Sessions and Sessions Held in the Process of Teaching the Skill of Subtracting Two-Digit Numbers from Two-Digit Numbers Without Decimal Conversion

When Figure 19 is examined, in the first and second sessions of the think-aloud method designed with numbers, Ayşe's ability to subtract two-digit numbers from two-digit numbers without decimal conversion was performed with the teacher being a model. While in the third and fourth sessions, she performed the subtraction with verbal hints. Additionally, she did it independently in the fifth and seventh teaching sessions. In contrast, in the eighth and ninth sessions, it was observed that she completed the instruction with verbal hints. It was observed that the student independently performed at the level of three consecutive sessions between the tenth and twelfth teaching sessions. Furthermore, the diary example of the teacher at the end of the teaching sessions is given in Figure 20 below. According to Figure 20, it is seen that the teacher observed Ayşe's development and acted following her planning. In Figure 21, the same statement in Ayşe's diary about the 12th session is given.

bugün çıkarma işlemi yapım yan yana çıkarma işlemi yaptım altına çıkarma işlemi yaptım parmaklarımca yaptım. Gözeldi. kolaydı zorcanmadan kolayca yaptım hoşuma gitti. çıkarma işlemi öğretilmiş garpmaydık öğreneneğim insallah cuma günü karne alacağım. noel'm zayıf değil çok iyi!

"I continued the sessions until the student achieved at least 3 independent sessions of teaching objects, pictures/shapes and fingers in subtraction with two-digit numbers. Although Verbal Clues are needed in some steps, I saw that a correct result was achieved in the activities. I ended the teaching sessions because my student, who constantly expresses the interpreting stages of the subtraction, did the subtraction of 2-digit numbers from 2-digit numbers with verbal clues in some sessions while did it independently in the last 3 sessions. I will end the implementation of my plans by doing the final test and interviewing."

Figure 20. Fifth session in the teacher's diary

16.01.2022
2 basamaklı sayılarda çıkarma tablosunda nesnelere, resim/şekil ve parmakla yapılan öğretimi en az 3 oturum boyunca oturum geçtikçe artırılmaya karar verdim. Bu oturumlarda sözel ifade gerektiren ihtiyaç duyulmasına rağmen etkinliklerin başına bir soru ekleyip soruları cevaplamak istemiyen öğrencilerden bazıları için sözel ifade eden öğrenciler 2 basamaklı-2 basamaklı sayılarda yapılan çıkarma işlemlerinde hangi basamakları kullandığını ve nasıl yaptığını bu oturumlarda sözel ifadeyle yaptıkları sorularla 3 oturumda 2 soru sorularını soruldu. Soruların cevapları yapıldı. Soruların uygulanmasına son vereceğim.

"I did subtractions today. I did subtractions side by side and subtract top and bottom. I did it with my fingers. It was good and easy. I did it easily without difficulty. I liked it. I learned subtractions. I will also learn to multiply. Hopefully we'll get a report card on Friday. My grade is not bad, very good."

Figure 21. 12th session in Ayşe's diary

When Ayşe's opinion in Figure 21 is examined, it can be concluded that the student has a positive opinion towards the lessons conducted with the think-aloud method. In addition, Ayşe, who thinks that she has accomplished the subtraction skill, said, "...I did it easily without any difficulty. I liked it. I learned the subtraction process...". Based on the statement, it can be said that the student has positive thoughts about the process of learning subtraction and has learned to perform subtractions. The statement "...I will learn to multiply too..." shows that this teaching process helps the student be motivated and gain a positive perspective towards future subjects.

The percentages of all teaching sessions prepared according to the think-aloud method in teaching the subtraction skill with Ayşe, the student's performances in the teaching sessions, and the number of sessions she independently performed subtraction are given in Figure 22.

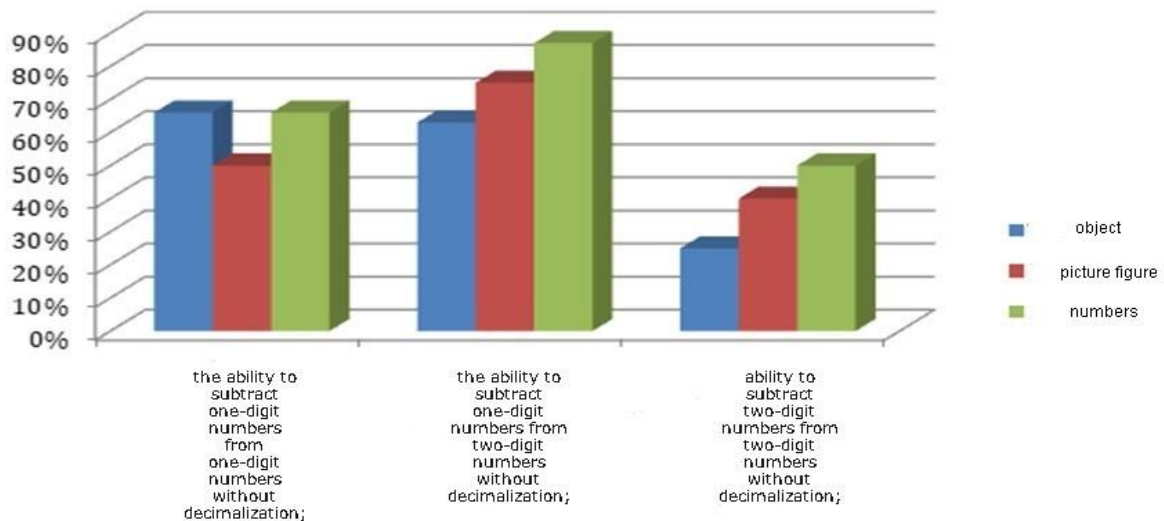


Figure 22. The percentages graph of independent performance in the sessions while teaching the subtraction skill

When Figure 22 is examined, 66% of the sessions in which subtracting one-digit numbers from one-digit numbers without decimal conversion were taught with objects were conducted independently. This was 50% with pictures and shapes and 66% with numbers. 63% of the sessions in which subtracting one-digit numbers from two-digit numbers without decimal conversion was taught with objects were conducted independently. This was 75% with pictures and shapes and 87% with numbers. Finally, 25% of the sessions in which subtracting two-digit numbers from two-digit numbers without decimal conversion were conducted independently. This was 40% with pictures and shapes and 50% with numbers.

11- The Post-Test Performed at the End of the Teaching Sessions and the Findings of the Interview

After the teaching sessions, the Criterion Dependent Post-Test, prepared in parallel with the questions in the Criterion Dependent Pre-Test, was applied to the analyzed steps. The data on Ayşe's performance in the post-test is given in Table 7 below.

Table 7. Data on the Performance of the Student in the Criterion-Based Post-Test

Instructions	Guidelines	Physical Assistance	Modeling	Verbal Hint	Independent
Tells the meaning of subtraction.	Tell.				X
Distinguish the symbol of subtraction.	Show. Tell.				X X
Subtracts single-digit numbers from single-digit numbers without decimal conversion.	Do it with the object. Do it with a picture/shape. Do it with numbers.				X X X
Subtracts single-digit numbers from two-digit numbers without decimal conversion.	Do it with the object. Do it with a picture/shape. Do it with numbers.				X X X
Subtracts two-digit numbers from two-digit numbers without decimal conversion.	Do it with the object. Do it with a picture/shape. Do it with numbers.				X X X

When Table 7 is examined, it is seen that the student did all the operations independently in the post-test, and it can be said that this study achieved its purpose. When the data obtained from the post-test with Ayşe is analyzed, it is seen that the student fulfills the statements independently. Ayşe's answer to the process of subtracting two-digit numbers from two-digit numbers with a picture/shape in the post-test is given in Figure 23 below.

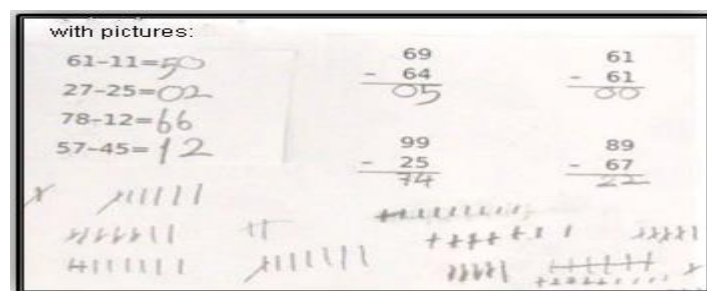


Figure 23. Example of Ayşe's answers to the process of subtracting two-digit numbers from two-digit numbers with a picture/shape in the post-test

When Figure 23 is examined, it is understood that the results are correct, in which 4 subtractions side by side and 4 subtractions one after the other are made with the help of sticks. At the end of teaching the subtraction skill, the findings of Ayşe's views on subtraction with the think-aloud method are given in Figure 24 below.

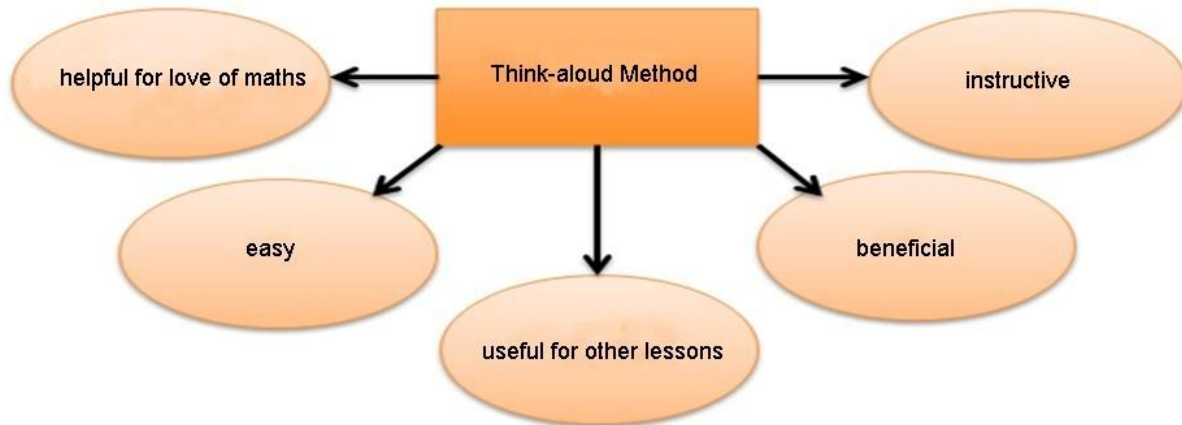


Figure 24. Concept map of the codes created about Ayşe's think-aloud method

When Figure 24 is examined, it is seen that Ayşe stated that the think-aloud method is helpful, easy, instructive, useful, and useful for other lessons.

Conclusion and Discussion

In this study, an applied study was carried out to eliminate the difficulty experienced by a student with mild intellectual disability in the subtraction process with the think-aloud method. At the end of the application process, the student could perform the subtraction without decimal conversion. During the application process, the researcher effectively carried out teaching sessions that included visual, auditory, and tactile stimuli and tools for think-aloud. This research, which includes the process of learning and expressing the subtraction skill by being aware of personal thought processes based on the performance of a student with a mild disability, also guided the researcher in arranging the teaching sessions according to the student. The student could not make sense of the subtraction skill in the pre-test and could not express the cognitive processes while using the subtraction. Still, the student began to express herself while subtracting by making sense of it as a result of the research. Supporting this result, Montague and Applegate (1993) and Swanson (1993) stated that students with learning disabilities cannot express their problem-solving skills and think less strategically than their peers. It can be said that these studies support the results of the research, considering that both study groups are individuals who require special education and that they have problems in processing information. In a similar study, it was found that reading comprehension is an important prerequisite skill in verbal problem solving in students with learning disabilities, and reading comprehension is an important factor in solving verbal problems in children (Kumaş, Dada, & Yıkılmış, 2019).

In the study, Ayşe practiced her independent thinking processes by exhibiting behaviors such as self-questioning, self-direction, and self-monitoring on mathematical operations after the teacher became a model for the student during the teaching sessions. It was seen that Ayşe realized the mistakes she made during teaching and tried to correct them. In particular, she explained how she did the subtraction in her student diary and realized that she made mistakes and got confused while doing the operation. The research concluded that the student realized her thought processes, corrected herself, and controlled herself by giving instructions. In a study supporting the result of this research

Rosenzweig et al. (2011) stated that the think-aloud method increased the productive thinking processes of students, that students became aware of their thinking processes and expressed themselves in mathematics skills. Ayşe noticed the mistakes she made during the implementation process and corrected them. In contrast, the practitioner researcher noticed the student's thought processes, organized the feedback correctly in the teaching sessions, and presented appropriate examples. The student corrected her behaviors by expressing them aloud. The think-aloud method was found to be effective. It has been understood that the think-aloud method can control the student's thinking processes. Supporting this study result, Parmar (1992) found that the think-aloud method obtained unique data and analysis about the students' cognitive processes. He stated that the method was beneficial to the classroom teacher in observing and recording the real performance of the student. As a result of the research they conducted with students with special learning disabilities, Uçar-Rasmussen and Cora-İnce (2017) stated that apart from mathematical operations, their reading comprehension levels increased with the think-aloud method and the level of knowledge of comprehension strategies increased. This study concluded that a student with mild intellectual disability had increased subtraction knowledge, skills, and strategy in mathematics. When the pre- and post-test results of Ayşe's subtraction process are examined in detail, it is seen that Ayşe could not perform most of these skills independently before the application and that she performed all of these steps independently after the application. After the application, Ayşe was able to independently perform the subtraction of single-digit numbers from single-digit numbers without the need to convert decimals and could subtract single-digit numbers from two-digit numbers. When these two stages are compared, it can be understood that subtracting single-digit numbers from two-digit numbers compared to subtracting single-digit numbers from single-digit numbers is more successful looking at the independence levels in the teaching sessions. Ayşe was able to independently perform subtraction of two-digit numbers from two-digit numbers without decimal conversion in the third stage.

In summary, Ayşe was successful in recognizing her thought processes and controlling herself with the think-aloud method and completed the subtraction independently. Emphasizing the importance of students with learning disabilities expressing mathematical operations with understanding and supporting this research, Montague and Applegate (1993) stated that the cognitive processes of students who operate without being aware of their thinking processes should be structured. In another study supporting this result, it was stated that the level of reading comprehension and metacognitive reading comprehension strategies of those with learning difficulties caused an increase in the level of knowledge and the think-aloud method was effective (Uçar-Rasmussen & Cora-İnce, 2017). Based on this idea, in this study conducted with the think-aloud method, it was concluded that the thinking processes of a student with mild intellectual disability were noticed, and the student's knowledge was structured correctly. She expressed a mathematical skill by understanding it and achieved a gain to a large extent. When she made a mistake in the teaching sessions, Ayşe was given feedback but not enough verbal reinforcement. As a result of the research, Ayşe liked to do the subtraction by thinking aloud, noticed her mistakes, and corrected herself. The student has become able to express herself while doing subtraction. Another study supporting this result determined that children with intellectual disabilities speak more quietly and speak less strategically than their peers. When they think and talk aloud, they solve problems more efficiently and increase their strategy use (Ostad & Sorenson, 2007). In another similar study, it was suggested that students with learning difficulties experienced self-confidence problems due to the student's difficulties in reading

skills (Görgün & Melekoğlu, 2019). Based on these results, it can be said that the think-aloud method is successful in Ayşe learning the steps of subtraction. It is an effective method that teachers can use as an alternative for students with mild disabilities to gain basic mathematical operation skills. As a result of the research, suggestions for other researchers and practitioners are as follows:

- The think-aloud method can also be used in subtraction, which requires decimal conversion, the next achievement of the subtraction skill.
- Based on the results of this research, which is limited to subtraction, the think-aloud method can be used in other mathematical skills and lessons.
- In this study, which is limited to action research and a single student, mixed methods can be used by increasing the number of samples to reach generalizable results.
- Teaching practice times can be increased to acquire other skills, and success can be increased by including fluency and retention sessions.

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Appendix 1. Criterion Dependent Test - Pre-Test and Post-Test Application Directive

The researcher and the participant sit opposite each other in the classroom. The observing researcher sits in an inconspicuous spot. The camera stops in an inconspicuous spot. The researcher says, "Hello Ayşe, you know that we will do a study with you. Thank you again for participating in our study." The researcher shows the chart in front of him and tells her that he will take some notes for the research to be more efficient. At the same time, reminds the student that what is done during the work will be recorded with the camera and shows the camera. Then the researcher says, "Ayşe, our work starts today. If you're ready, let's get started.". After the participant states that she is ready, he says, "Do the subtraction by thinking out loud." He gives her the number bars and watches how she subtracts. The result is requested to be written on the activity sheet. The activity sheet includes samples prepared according to the analysis of the extraction process. Instructions are presented and marked on the measurement tool. The session ends by thanking the student.

Appendix 2. Action Plan 1

Teaching session: modeling

Skill: Subtraction with objects

Purpose: Performs single-digit subtraction in the $\frac{3}{4}$ criterion without the need for decimal conversion with objects and the think-aloud method.

Duration: 10 minutes

Materials/tools: pencil, eraser, notebook, number sticks, performance record chart, voice recorder

Execution: The researcher and the participant sit opposite each other in the classroom. The observing researcher sits in an inconspicuous spot. The camera stops in an inconspicuous spot. The researcher says, "Hello Ayşe, you know that we will do a study with you. Thank you again for participating in our study." The researcher shows the chart in front of him and tells her that he will take some notes for the research to be more efficient. At the same time, reminds the student that what is done during the work will be recorded with the camera and shows the camera. Then the researcher says, "Ayşe, our work starts today. If you're ready, let's get started.". After the participant states that she is ready, he says, "Today we will do subtraction with objects. We're going to do this with the think-aloud method. The Think-aloud method allows you to hear yourself and someone else to hear you by vocalizing the activity or skill you are doing out loud. This way, you follow yourself, you can correct your mistakes, and your teacher can realize your mistake and help you correct it. First, I will show you how to subtract with the think-aloud method by being a model, and then I will ask you to do the same. If you listen carefully and do as I say, I will get you the food you want.". The teacher shows the process $7-3=$ and says, "What will I do? Extraction process. How did I get this? I saw the minus sign. What does minus/subtraction mean? It means I'm going to make a reduction. First, I prepare 7 sticks. Now I'm subtracting 3 of them and counting the remaining sticks. There are 4 sticks left; after I take 3 out of 7, there are 4 sticks left. I write the answer to the result of the operation." and continues the teaching by doing the other examples in the same way. The teacher observes the student and asks if they liked the process before finishing the teaching session. After the session, the teacher and student keep a diary about the teaching.

Teaching session: Independent applications

Duration: 15 min

Practices: The teacher says, "Ayse, I want you to do the subtraction by thinking out loud with the number sticks as I did. If you're ready, let's get started.".

Instructions are given if the student did not understand the subtraction process in the first application order. If she is not doing the stages independently, she is given a verbal hint and instructions in the first sessions. It moves from the verbal hint to the independent stage later. Reinforcements such as "Good, correct..." etc., are used at each stage. Then, the desired reinforcer is given at the end of the session. Teaching sessions are marked on the performance record table according to criteria. In other sessions, examples of mixed difficulty are used. After the session, the teacher and student keep a diary about the teaching.

Appendix 3. Action Plan 2

Teaching session: modeling

Skill: subtraction with pictures

Purpose: Performs single-digit subtraction with pictures/shapes in the $\frac{3}{4}$ criterion without decimals conversion using the think-aloud method.

Duration: 10 min

Materials/tools: pencil, eraser, notebook, activity sheet, performance record chart, voice recorder

Execution: The researcher and the participant sit opposite each other in the classroom. The observing researcher sits in an inconspicuous spot. The camera stops in an inconspicuous spot. The researcher says, "Hello Ayşe, you know that we will do a study with you. Thank you again for participating in our study." The researcher shows the chart in front of him and tells her that he will take some notes for the research to be more efficient. At the same time, reminds the student that what is done during the work will be recorded with the camera and shows the camera. Then the researcher says, "Ayşe, our work starts today. If you're ready, let's get started.". After the participant states that she is ready, he says, "Today we will do subtraction with pictures. We're going to do this with the think-aloud method. Then I will ask you to do the same. If you listen carefully and do as I say, I will get you the food you want.". The teacher shows the process $5-3=$ and says, "Since the minus sign is given in the operation, I will perform the subtraction. Subtraction means reduction, lowering. Now I have to count how many pictures there are. 5 pictures are given. I need to remove 3 of them. I cross them out. I'm counting the remaining pictures. 2 remain. I am writing the answer to the result of the operation" and continues the teaching by doing the other examples in the same way. The teacher reinforces the student by listening then finishes the teaching. After the session, the teacher and student keep a diary about the teaching.

Teaching session: Independent applications

Duration: 10 min

The teacher says, "Do the subtraction by thinking out loud with pictures as I did. Start. ". When the student makes mistakes in the first sessions, instructions for each step are given, and verbal hints are provided. Every time she gets it right, she's reinforced. Teaching sessions are marked on the performance record table according to criteria. The student is given a reinforcer, and in other sessions, the difficulty levels are increased, and examples of the process are presented. After the session, the teacher and student keep a diary about the teaching.

Appendix 4. Action Plan 3

Teaching session: modeling

Skill: finger extraction

Purpose: Performs one-digit subtraction using fingers in the $\frac{3}{4}$ criterion without decimal conversion with the think-aloud method.

Duration: 10 min

Materials/tools: pencil, eraser, notebook, activity papers, performance record chart, voice recorder

Execution: The researcher and the participant sit opposite each other in the classroom. The observing researcher sits in an inconspicuous spot. The camera stops in an inconspicuous spot. The researcher says, "Hello Ayşe, you know that we will do a study with you. Thank you again for participating in our study." The researcher shows the chart in front of him and tells her that he will take some notes for the research to be more efficient. At the same time, reminds the student that what is done during the work will be recorded with the camera and shows the camera. Then the researcher says, "Ayşe, our work starts today. If you're ready, let's get started.". After the participant states that she is ready, he says, "Today we will do subtraction with pictures. We're going to do this with the think-aloud method. Then I will ask you to do the same. If you listen carefully and do as I say, I will get you the food you want". The teacher says, "In this lesson, we will do the subtraction through the think-aloud method using our fingers. I will subtract 2 from 7". Showing the operation $7-2=$, the teacher says, "How did I get this? From the minus sign. Subtraction means reduction. First, I keep 7 in mind, preparing the number 2 that I need to subtract with my fingers. I know that if I count backward, I'm going to reduce. I subtract 2 backward from 7 with my fingers. 6, 5... 5 remains, and I write the result opposite the operation." and provides other examples. The teacher reinforces the student by listening then finishes the teaching. After the session, the teacher and student keep a diary about the teaching.

Teaching session: Independent applications

Duration: 10 min

The teacher says, "Do the subtraction by thinking out loud with your fingers as I did. Start. ". When the student makes mistakes in the first sessions, instructions for each step are given, and verbal hints are provided. Every time she gets it right, she's reinforced. Teaching sessions are marked on the performance record table according to criteria. The student is given a reinforcer, and in other sessions, the difficulty levels are increased, and examples of the process are presented. After the session, the teacher and student keep a diary about the teaching.