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Development of Problem-Solving Skills of a Student with Cochlear Implant in Social Studies: An Action Research

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Children with hearing loss may have difficulty controlling/manipulating variables when solving multi-item problems when their language skills are not fully developed. Therefore, this situation limits students with hearing loss from using the strategies needed to solve problems. The aim of this research is to study the developmental process of the problem-solving skills of a student with a cochlear implant in Social Studies courses in an inclusive environment. This paper presents action research. The participants of the study consisted of a 6th grade student with cochlear implant in an inclusive environment, the researcher, the social studies teacher, and the members of the validity committee. The research was conducted between September 27, 2022, and January 5, 2023. Research data were collected using individualized education program, instructional plans and audio-visual materials, observations, interviews, documents, problem solving skill assessment rubric and research journal. Based on the outcomes of a fourteen-week teaching practice, it can be claimed that the student has gained an awareness of the operations in the problem-solving process; however, he still has difficulty transferring his existing knowledge of Social Studies subjects and applying it to new tasks, and there is a persisting need for supplementary education in performing these operations independently.

Introduction

Problem-solving is one of the most important skills in adapting to social life. Problem-solving is defined as the process of applying and creating solutions to unusual situations by combining new information with previously acquired knowledge and experiences (Laurent, 2014; Luckner & McNeil, 1994; Marschak & Everhart, 1999). Problem-solving is a complex procedure that requires the use of sensory and cognitive skills. It is a multistage process that requires analysis, decision-making, research, identifying different solutions, and choosing one (Luckner & McNeil, 1994; Riecken & Miller, 1990). Problem-solving skills have an important place in the Social Studies curriculum due to the nature of the course, which encompasses diverse topics such as history, geography and citizenship, (Marston & Handler, 2016; Riecken & Miller, 1990). Social Studies offers learners a critical perspective on the required information to solve real-life problems and enables them to critically evaluate the

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learning process. Besides, Social Studies education constitutes a learning process that associates diverse disciplines, which prepares students for their future roles and responsibilities. These features of the Social Studies course which attest to its significance also make the content difficult to understand and learn, and ensure its retention. (Grant et al., 2017; Johnson & Lamarr, 2020). Therefore, students' individual needs and pace of learning, along with the teaching methods, play a critical role in the achievement of the goals of the program and the principles of inclusive education.

Students with hearing loss can display similar levels of development in their oral language skills to their hearing peers through the early provision of hearing aids, cochlear implants and preschool education (Boons et al., 2013). Advancements in cochlear implant applications have enabled children with hearing loss to perform compatibly with their hearing pairs in speech perception and speech intelligibility (Vermeulen, et al 2012). These advancements have enabled children with hearing loss to share the same educational environment with their hearing peers through inclusive education practices all around the world. Despite all these advancements, recent research concludes that students with cochlear implants still perform poorly compared to their hearing peers in general education environments in terms of academic skills (e.g. reading, writing, math, science) (Choi et al., 2020). Language plays an important role in problem-solving skills due to its representative and communicative functions. Children with hearing loss are likely to have difficulty controlling/manipulating variables when solving polyadic problems when their language skills are not fully developed. Consequently, their ability to use the strategies needed to solve problems is limited. This limitation in problem-solving skills negatively affects these students' ability to access new information using their experiences, transfer knowledge, develop academic skills, and engage in social interaction (Luckner & McNeil, 1994). This study examines the development of the problem-solving skills of a student with a cochlear implant in a general education environment within the scope of Social Studies education.

There are various studies that examine the problem-solving skills of hearing students in Social Studies education (Abdu-Raheem, 2012; Altun & Emir, 2008; Baysal, 2003; Çetin, 2011; Çiftçi et al., 2004; Deveci, 2002; Gülfidangil, 2007; Güllühan, 2021). It has been determined in these studies that students who have acquired problem-solving skills also develop independent learning and reasoning skills, are able to establish relationships between real life and information (Çiftçi et al., 2004), that their knowledge retention levels and academic achievement increases (Altun & Emir, 2005; Deveci, 2002) and that they develop a positive attitude towards the course (Deveci, 2002; Gülfidangil, 2007). It was observed in Baysal's (2003) research that this strategy does not emerge in students who do not have learning habits oriented towards problem-solving. Therefore, it is emphasized that children should be introduced to problem-solving skills early in childhood, and activities that foster problem-solving skills in Social Studies courses are carried out in the later years. Çetin (2011) and Güllühan (2021) have determined that applications that improve problem-solving skills enable students to solve problems at school and in their daily lives and use metacognitive thinking skills such as establishing relationships between past and new information, using resources, and conducting research.

Only a limited number of studies have been conducted on the problem-solving skills of students with hearing loss. These studies focus on problem solving skills related to cognitive skills and mathematics. Luckner (1992) applied a problem-solving test using a puzzle and compared the problem-solving skills of hearing students and students with hearing loss. The findings show that the hearing group can solve the problem with less effort and faster than the

hearing loss group. Luckner and McNeill (1994) focused on the problem of transformation with puzzles. The results show that the achievements of students with hearing loss were lower compared to hearing students, but the difference between the two groups decreased gradually as they got older. In another study, Marsharck and Everhart (1999) applied the Twenty Questions game with mathematical content to participants with and without hearing loss and compared scores. It was observed that the scores of students with hearing loss were lower compared to their hearing peers. It was also observed that hearing students could find solutions to a problem they were facing for the first time, while students with hearing loss could only solve problems they had experienced before. The researchers attributed these results to the limited language skills and experiences of students with hearing loss. In a study conducted by Laurent (2014), the scores of students with and without hearing loss in a problem-solving test in academic and social skills were examined. Students with hearing loss were observed to get lower scores on the test. It was found that each child with hearing loss had strengths and weaknesses at different stages of the problem-solving process, and it was emphasized that the individual needs of students with hearing loss should be taken into consideration when creating the educational program.

As suggested by Laurent (2014), the fact that the performance of students with hearing loss in problem-solving skills varies according to individual differences necessitates that the programs and applications should be organized in accordance with individual needs during the teaching process. Students with hearing loss in a general education environment in particular can perform similarly to their hearing peers in the development of skills related to Social Studies, as in other academic fields, with supplementary educational services provided in accordance with their needs (Akay, 2018). It is believed that the findings of the current research could help determine in a general educational environment, the areas where a student with hearing loss who has had a cochlear implant at an early age needs supplementary education to develop problem-solving skills, to point out his strengths and weaknesses, and to organize educational practices accordingly. The aim of this research is to study the developmental process of the problem-solving skills of a student with a cochlear implant in Social Studies courses in an inclusive environment. In line with this purpose, the researcher has sought answers to these questions:

(1) How was the training process conducted?
(2) How has the student's problem-solving skills improved?

Methodology

Research Design

This study employs action research. Action research, which covers taking action, evaluation and reflection, is a process aimed at improving educational practices (Koshy, 2010). Action research can be designed as participatory and collaborative. In participatory action research, the researcher and the participants of the research come together in interaction to understand a social issue or an identified problem. In collaborative action research, researchers and practitioners identify together the problems that arise in practice, the factors that cause these problems and ways of intervention (Meriam, 2002).

In the current study, the participants, consisting of the researcher, students, teachers and the validity committee, worked interactively to interpret the problem-solving phases. At the same time, these participants worked collaboratively in making, implementing and evaluating action plans to solve the problems that emerged in the development of problem-solving skills. Therefore, this research is a participatory and collaborative action research.

In this research cycle, the limitations in problem-solving skills in Social Studies education of a student with cochlear implants were determined, the interventions were planned, the process was analyzed after each intervention, and the intervention areas needed by the student for problem-solving were determined and the teaching resumed. Problems arising in the process, suggestions for solutions and limitations in the student's performance were discussed at validity meetings where new action plans were created.

Participants

The research was carried out in an inclusive environment in Turkey. The participants of the study are a student with cochlear implants, a researcher/teacher, a Social Studies teacher, and members of the validity committee.

The participating student was chosen using the criterion sampling method. A total of 8 students with cochlear implants needing supplementary education in Social Studies education in inclusive environments were approached and the study was conducted with a student who volunteered to participate in the research. Demographic, audiologic and educational information of the participant student is presented in Table 1.

Table 1. Demographic, audiologic and educational information of the participant student

Gender	Male
Date of birth	15.12.2011
Grade level	6th grade
Time of onset of hearing loss	Congenital
Date of diagnosis of hearing loss	13.02.2011
Mean hearing loss	*left:* 95 dBHL *Right:* 60 dBHL
Date of first hearing aid fitting	17/03/2011 (right/left behind the ear)
Family education	3 years
Cochlear implant date	16/03/2015 (right ear)
Preschool education duration	3 years
Preschool education environment	Special education school (hearing impaired) 2013-2016
Primary school educational environment	Special education school (hearing impaired) 2017-2020
Secondary school educational environment	Inclusion 2021

The participant is a sixth-grade student and has congenital sensorineural hearing loss. His hearing loss was diagnosed at the age of 2 months; the first hearing aids were fitted to both ears at the age of 3 months. A cochlear implant was fitted to the left ear when the student was 3 years and 3 months old. In the evaluations made by the guidance service, it was stated that the student had no additional disability other than hearing loss and that the Wisc-R evaluation result was in the range of 90-110 points. The student completed family education and preschool education at a school that provides auditory-verbal education to children with hearing loss and was placed in an inclusive environment at an elementary school after the oral language skills evaluation. Means of communication for the child at home and at school is oral language.

The researcher has 25 years of experience in education and supplementary education services for students with hearing loss. She has conducted research on educational approaches in the areas of supplementary education and mentoring in Literacy, Social Studies, Science and Mathematics education. Planning, implementation and assessment of the supplementary education have been carried out in coordination with the family.

The Social Studies teacher has 20 years of teaching experience. She teaches Social Studies in the secondary school department of a public school. The Social Studies teacher has been working with the participating student for 2 years. Throughout the research, she provided

weekly feedback on the student's classroom performance and the direction of the supplementary education.

The validity committee consisted of two members with 36 and 30 years of experience in the fields of early intervention programs, educational approaches for the development of language and academic skills in children with hearing loss, and qualitative research methods. Members of the Committee held thirteen meetings between September 27, 2022 and January 4, 2023. The data related to the supplementary education process were assessed on a weekly basis, and decisions for the next stage were determined in accordance with the student's needs during these meetings (Table 2).

Table 2. Date, duration and decisions of validity meetings

Weeks	Dates	Duration	Decisions
1	27.09.2022	25´34´´	• Preparation of rubric for assessment and evaluation of initial performance • Lecturing first because the student needs to discuss his missing information
2	04.10.2022	26´41´´	• Using the case studies in the SS textbook in problem solving steps because they summarize the topics • Student search for information from images and videos on the internet
3	12.10.2022	27´18´´	• Not giving clues to the student with questions, directing them to take clues from the text • Explaining to the student that he should choose one of the solution ways he has determined and justify it
4	19.10.2022	39´34´´	• Using the educational platform because of the student's difficulty in selecting and understanding the information on the internet during the research process • Using visuals with problems in case studies so that students can identify the problem
5	25.10.2022	16´40´´	• Adding visuals with all solutions to the presentations so that students can identify the solutions
6	09.11.2022	30´34´´	• Writing the solutions to make it easier for the student to choose one of the solutions
7	23.11.2022	20´53´´	• Explaining to the student that doing research enables them to identify solutions
8	07.12.2022	22´00´´	• Direct demonstration to the student of the relationship between problem identification and analysis
9	14.12.2022	14´40´´	• Diversifying the printed resources available for students to conduct research
10	21.12.2022	19´50´´	• Explaining that he can use the solutions they find to problems in his own life
11	28.12.2022	16´10´´	• The student experiences map coordinates using information technologies during the research process
12	04.01.2023	11´37´´	• Preparing questions focused directly on his own life to help him analyse the problem
13	09.01.2023	16´20´´	• Review and interpretation of data

Data Collection Methods

Triangulation plays an important role in increasing credibility in action research (Bogdan & Biklen, 2007). Accordingly, data were collected using individualized training programs (IEP), teaching plans and materials, observations, interviews, documents, problem-solving skill evaluation rubric and a research diary in line with the current research purpose.

During the IEP preparation process, unit members came together at the beginning and end of the semester, and the level of achievement of the targeted goals and objectives for problem-solving skills was examined. Educational purposes for the subject covered in the classroom were determined, and the materials to be used and the functioning of the application were decided in advance every week. The materials used during practice were photos, educational videos that visually support the subjects along with the 6th grade coursebook, a globe, an atlas, maps and PowerPoint presentations. Observations concerning the support provided during the implementation process of the research were video recorded. The researcher held interviews with the Social Studies teacher on a weekly basis to determine the educational objectives. In addition, semi-structured interviews were held with the teacher at the beginning and end of the applications and all interviews were audio recorded. The student information form containing the demographic, audiological and educational information on the student, audiograms, guidance and research center reports, evaluation results and teacher information form were examined within the scope of the documents. In the applications in the research process, the steps of problem-solving ability; identifying the problem, analyzing the problem, researching, identifying possible solutions, choosing a solution and justifying the steps have been used. A problem-solving skill evaluation rubric has been developed to identify the areas where the student needed support and determine the benefits of the interventions. Each of the problem-solving achievements in the rubric was graded as the student does it without help (3), does it through questions (2), does it through explanations (1), cannot do it despite questions and explanations (0). The opinions and thoughts of the researcher/teacher regarding the teaching process were reflected in the research diary and shared with the validity committee in the process of deciding on the course of action.

Data Analysis

The analysis of data is of critical importance in the action research cycle. The data analysis process, which takes place simultaneously with the data collection process, includes the re-monitoring, breakdown, categorization and interpretation of interventions (Mills, 2017). In the current research, a breakdown of the interventions was performed every week, the documents were examined by the validity committee, the applications were evaluated on a weekly basis and the improvements seen in the problem-solving steps were categorized. Consequently, the themes of (a) developing different perspectives (b) associating events, (c) getting detailed information about events, (d) creating solutions to and justifying events have emerged. The data analysis process was monitored by the validity committee.

Trustworthiness

Validity studies in action research are carried out to ensure the credibility of the research. The reliability of academic research consists of components such as credibility, transferability, dependability, and confirmability (Stahl & King, 2020). In order to ensure reliability in this research, a variety of data collection tools were used, video and audio recordings were made, in-depth and longitudinal data collection was carried out, the entire process was monitored by the validity committee and the findings were validated with the participating teacher. In addition, the researcher was aware that she was an insider and tried to get rid of her presuppositions and prejudices while conducting the interviews and analysis. The comments and inferences made by the researcher about the themes that emerged as a result of the analysis were presented to the validity committee and their approval was obtained.

Ethics

Required permissions and approvals from the ethics committee of the university (E-30237869-050.99-320565) and the Ministry of Education were taken prior to this study. The participants were informed about the purpose and procedure of the research and gave their informed consent to voluntarily participate in the study.

Results

Instructional process

After the interview with the teacher at the beginning of the research process, it was determined that the student's participation in discussions in the classroom in Social Studies teaching was limited, he had difficulty in establishing relationships, making inferences, answering questions and performing problem-solving steps. In the IEP meeting held on September 21, 2022, the skills that the student can acquire independently and those that require external support have been determined and an IEP for Social Studies Course has been developed. In Turkey, support education services are carried out with one or a few students outside the classroom in a support education room (Ministry of National Education, 2018). Therefore, in this study, the support education process was carried out with the participant student in the resource room. On September 22, 2022, which intended to determine the initial performance of the student, it was observed that the student had difficulty explaining the concepts relating to Social Studies and using past knowledge in the present context. Weekly meetings were held with the teacher starting on September 29, 2022, during which teaching strategies were determined, teaching plans and materials were prepared, and applications were made and assessed. The current research scheme consists of a cyclical process including planning, implementation, and evaluation (Figure 1).

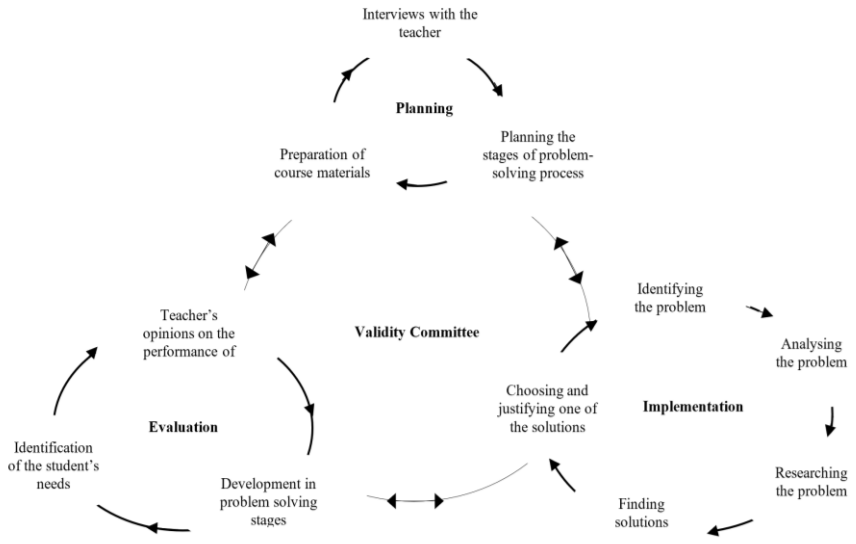


Figure 1. Instructional process

During the research, instructional practices for problem-solving skills were carried out with the participating student every week for two class hours (40´+40´). All of the educational interventions were carried out in a supplementary education room in the student's school and video recorded. The dates, content, objectives and materials used in these intervention

sessions are presented in Table 3.

Table 3. Dates, objectives, contents and the materials used

Weeks	Dates	Objectives	Content	Materials
1	27.09.2022	Review of the previous topic	Us and Our Values (Citizenship)	Textbook Subject-specific illustrations and photographs Educational animation videos History atlas Timeline Globe Atlas Compass Google Earth App
2	29.09.2022	Review of the previous topic		
3	05.10.2022	Covering the topic in class		
4	06.10.2022	Covering the topic in class	Journey into History (History)	
5	13.10.2022	Preparation for the next topic		
6	20.10.2022	Preparation for the next topic		
7	27.10.2022	Review of the previous topic		
8	10.11.2022	Review of the previous topic		
9	01.12.2022	Review of the previous topic		
10	08.12.2022	Review of the previous topic		
11	15.12.2022	Covering the topic in class		
12	22.12.2022	Covering the topic in class	Life on Earth (Geography)	
13	29.12.2022	Covering the topic in class		
14	05.01.2023	Covering the topic in class		

The interventions during the research were carried out between September 27, 2022 and January 5, 2023 as shown in Table 2. In each intervention, relevant content from the coursebook was prepared and audio-visual materials were enriched, while the student was encouraged to use his existing knowledge and integrate this knowledge into the new content so that he can use the problem-solving skills that are in line with the content of the course.

The results of the first assessment conducted on 22.09.2022 to determine the performance of the participating the student were discussed at the 1st validity meeting. The decisions taken at this meeting determined the functioning of the applications (Figure 2).

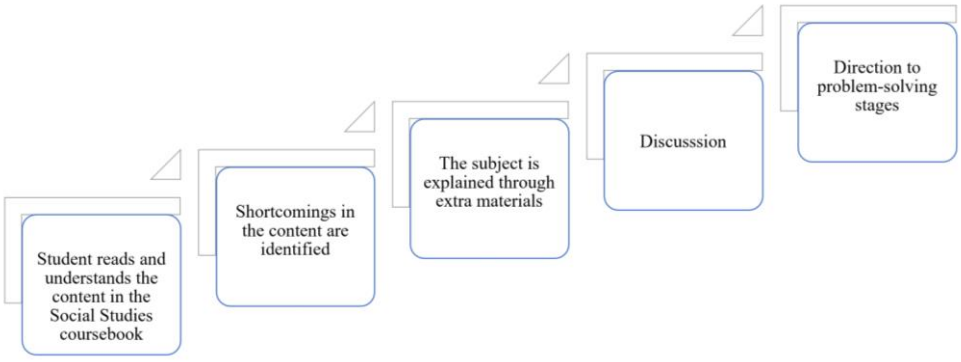


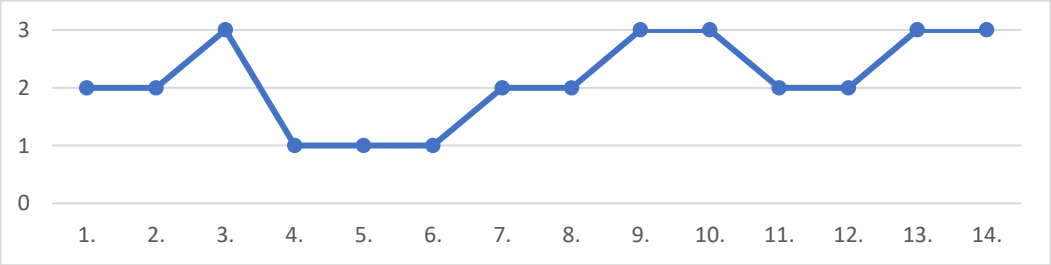
Figure 2. The functioning of interventions

After the interviews with the Social Studies teacher, materials related to the subject needed by the student and processed in the classroom were prepared, interventions were planned, and questions leading to problem-solving steps were prepared. As shown in Figure 2, the student was asked to read and explain the topic in the Social Studies course book every week at the beginning of the course. Based on the outcome, information gaps on the subject have been determined, and the student was offered help using various materials in order to complete this information. This was followed by a conversation/discussion environment, created through leading questions to help the student use his past knowledge and experiences. Finally, the questions leading to the problem-solving steps were asked and the stages of identifying and analyzing the problem, researching, choosing, and justifying the solutions were carried out by the student. The findings related to the development of the problem-solving skills of the

student are presented under the themes of developing different perspectives towards events, associating events, gaining in-depth knowledge about events, and creating and choosing solutions to problems.

Theme 1. Developing a Different Perspective Towards Events

The first stage of problem-solving is to identify the problem. The weekly assessments of the participating student's ability to determine the problem suggest that he could determine the problem unaided in 5 topics, with hints given through questions in 6 topics, and with explanations in 3 topics (Graph 1).



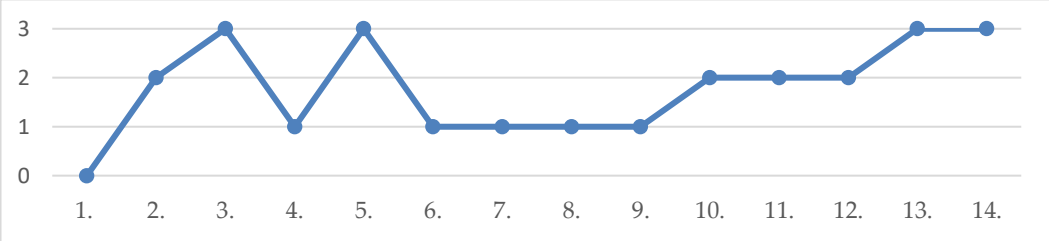
Graph 1. Developing a different perspective towards events

As an example, the case of prejudices towards a homeless child was analyzed in Week 1. To help the student identify the problem, he was asked why the child was sad. "He was rummaging through trash. Because he is poor and has lost his mother," he replied. Since his answer was not linked to the main problem in the text, a leading question was offered as a clue: "How do booksellers behave?" The student was then able to identify the problem by saying, "Booksellers are prejudiced." In another case, on a topic in Week 4 that compares the way of life in Central Asia in the past with today, the student replied to the question **"**How did nomadic people live?" by saying "They were migrating by horse-drawn carts" and was able to determine the problem without assistance. On this development at the third validity meeting, it was decided that the student should not be given hints with questions to identify the problem but should only be directed to take hints from the text unaided. However, during the three sessions that followed, it was found that the participating student could determine the problem only through explanations. For example, in order to determine the problem of trade routes in history in Week 6, the student was asked, "What did the countries in Central Asia want?" but the student could not find the answer to the question from the text. Despite being directed to the text by explaining "What they want is written here," the student was unable to identify the problem. It was later seen that the student was able to find the answer only after the guidance provided by pointing out that they wanted to control something and that it was written there. To make it easier for the participating student to identify the problem, it was decided in the fifth validity meeting to add visuals containing the problems in case studies to the course materials. Following this intervention, while the wars between the Central Asian states were being discussed in Week 10, the student was asked, "What happened between the states in Central Asia?" It was observed that he was able to answer this question unaided by taking a hint from the text and the war picture in the textbook, saying, "There was a war, the Talas War." In the last two sessions of the research, it was seen that the student was able to determine the problem without assistance. For example, on being asked **"**Where can we find information about the topography of a country?" during Week 12, while studying geographical locations, the student was able to respond unaided by saying from the atlas, from the maps." The text in the textbook, the atlas that was studied and the physical map in the visuals in the course book enabled the student to identify the problem.

The student's performance in identifying the problem varied greatly throughout the 14-week process. In the first weeks, he was able to identify the problem when he was guided through questions; however, between weeks 4 and 7, he was able to do so only when some explanation was offered. In later weeks, he was able to identify the problem without assistance. Potential reasons for this variation could be linked to the nature of the topics in each period, the first weeks covering topics on citizenship that the student can grasp and experience in person, the second period, covering topics and concepts relating to governing and trade and the last period, covering topics on geography that the student can easily observe.

Theme 2. Associating Events

The second stage of the problem-solving process is the analysis of the problem. It was observed that the participating student was able to analyze the problem unaided in 4 topics, with questions in 4 topics, with explanations in 5 topics, and could not analyze the problem in 1 topic (Graph 2).



Graph 2. Associating events

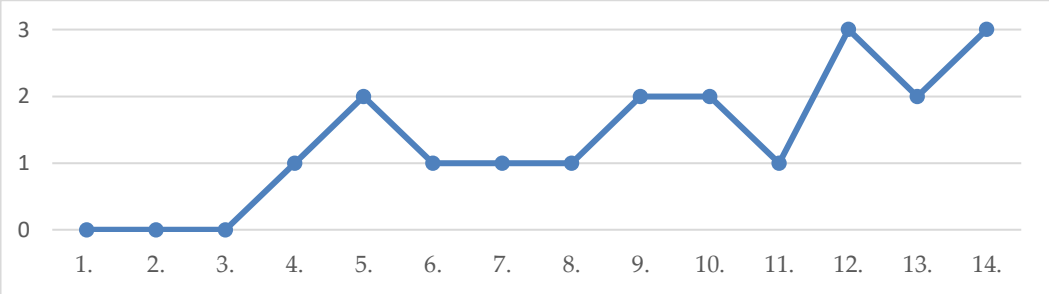
The student was not able to analyze the problem in the first session. It is believed that this was because he could not understand what was being asked of him. It was observed that the student required substantial help with topics related to history in order to analyze problems. However, on the History topic of Week 5, related to the wars between Central Asian states in the past, he was able to analyze and answer the question What did the Chinese do to stop enemy attacks?" without assistance by using visual clues, as "Great Wall of China." On the contrary, it was observed that the student was unable to analyze the question about the consequences of the wars between Central Asian states in Week 7 despite guiding questions. For example, the student failed to answer the question "Why did the Central Asian countries want to become independent?" despite the guidance offered by the question "Why did they refuse to be ruled by the Chinese?" He was only able to answer the question after another follow-up question "Did the Chinese allow others to do what they wanted?" which contained the answer, as "No, they had to do as the Chinese said." At the 8th validity meeting, held after this session, it was decided that the student should be explicitly taught the relationship between problem identification and analysis.

After Week 10, it was seen that the student was able to analyze problems when given clues with questions. On being asked the question "Why did the states in Anatolia fight each other?" the student was able to analyze the question and respond by saying "To expand their territory." In the validity meeting in Week 10, it was decided that the student should be told that he could use the solutions he has come up with for the problems in real life. The student needed clues to answer the question "What purpose do the coordinates on the maps serve? in Week 12. After he was shown the meridians and the parallels on the globe and told that these were what coordinates showed, he was asked what could happen if we didn't have coordinates while flying from Ankara to Istanbul. He was then able to say that the planes would be lost

without the coordinates. In the validity meeting number 12, it was decided that the student would be asked questions focusing on his own life so that he would be able to analyze the questions. In Week 14 of the study, he was able to answer the question, "Why is it 10°C in Ankara while it is 19°C in Çeşme?" by saying "Because Çeşme has a Mediterranean climate while Ankara has a continental climate" showing that he was able to analyze the problem.

Theme 3. Getting In-Depth Information About Events

The third stage of the problem-solving process is researching the problem. It was observed that the student investigated the problem with no help in 2 topics, with questions in 4 topics, with explanations in 5 topics, and could not do research despite questions and explanations in 3 topics (Graph 3).



Graph 3. Gain in-depth information about events

It has been observed that the participant was reluctant to do research about the problems in the first sessions. For example, in a sample event with the content of assistance after the earthquake in the second week, the student was asked "What do you know about the earthquake?" he responded by saying "An earthquake is something that shakes," not attempting research to learn more about the earthquake. The researcher typed "fault line" into the search engine on the Internet and showed the student images, videos and information. However, it was observed that the student had difficulty reading and understanding the information on the Internet. At the second validity meeting, it was decided that the student should research the information from images and videos on the Internet. Because the student still did not want to conduct research in the next two sessions, the researcher explained the information from videos on the Internet and printed encyclopedias to exemplify conducting research. As a result of these efforts, when the student was asked, "What do you know about the Great Wall of China?" while researching the Central Asian states in the past in Week 5, he said, "High, solid." Afterwards, when he was asked "Do you want to research the Great Wall of China?" he replied affirmatively. The student was offered guidance at each stage to conduct research via the Internet and reached the documentary. However, the documentary he chose was too long and limited the time required to work on other steps of the problem-solving process. At the 4th validity meeting, due to the limitations of the student in choosing and using Internet resources, it was decided that the student should use the educational platform used by the researcher to supplement the lecture for research.

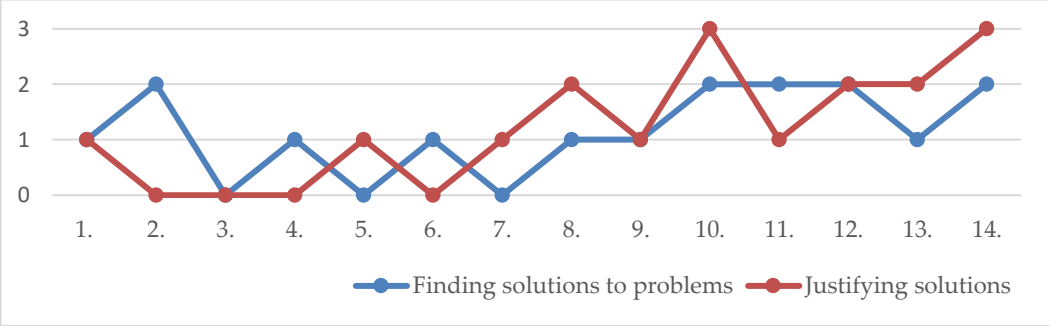
In subsequent sessions, it was observed that the student made an attempt to conduct research. Especially in Week 9, he showed an interest in watching videos and discussing the wars between states. At the 7th validity meeting which took place after Week 9, it was decided that the student should be told that he could now identify the solutions by conducting research. Next week, while the wars between the Central Asian states were being discussed, he was told that he could answer the question "What happened as a result of the Talas War?" by referring

to the events in the video he watched during his research. Considering the content he had seen in the video, he was able to say "They learned new inventions from each other."

It was observed that the student was unable to do research unaided in later sessions and was in need of guiding questions. For example, on the subject of geographical location in Week 14, he was unable to determine how he could do research for the question "What tools other than maps can we use to determine the coordinates today?" Only when he was given a hint with the question, "What else can we use to find our way?" was he able to suggest a compass. On further guidance with the question, "How do we find it using the mobile phone?" he showed the map application and stated that he had used it before. When the student was shown the use of computer software called Google Earth, it was observed that he was motivated to search for his family's summer house.

Theme 4. Creating and Justifying Solutions

In this theme, the steps of identifying potential solutions and the justification of chosen solutions are discussed together. It was observed that the participating student could not find the solutions to the problems without help, could identify the solutions with questions on 5 topics, explanations on 6 topics, and could not identify the solution despite the questions and explanations on 3 topics. It was also seen that the student could justify the solutions without help in 2 topics, with questions in 3 topics, with explanations in 5 topics, and could not do it despite questions and explanations in 4 topics (Graph 4).



Graph 4. Creating and justifying solutions

The student had difficulty both in producing and justifying the solutions despite the tips and explanations for 3 weeks. For example, in Week 3, the topic was about a university student who reported a problem related to the use of the bicycle roads by pedestrians with a petition. When the student was asked "What else could the cyclist do for a solution?" he replied only by referring to the actual path taken by the person in the sample event by saying, "He made a complaint." When he was asked what else he could do, he replied by saying, "He can tell them to get off the road and he can warn them with the ring on the bicycle." Then, the student was shown a traffic sign, a bicycle symbol on the road, and signs that said that pedestrian and cars were not allowed. It was explained that pedestrians should obey traffic signs and respect the rights of bicycle users. When he was asked what he would do to solve this problem so that he chooses one of the solutions and justifies it, he simply said, "I would change my way. Not to hit the pedestrians." He was seen to come up with a new solution instead of choosing one of the existing alternatives. It was decided at the third validity meeting that the student should be told to choose and justify one of the solutions determined by him. It was observed in Week 6 that the student was unable to choose and justify his own solutions. Therefore, in order to enable the student to identify the solutions, it was decided in the fifth validity meeting that visuals containing all possible solutions in the book should be added to the

presentations used in the discussion on the topic. In Week 6, the student was able to answer the question **"**What did they do to control the Silk Road?" which was intended to help him identify the solutions to the problems concerning trade routes in the past when he was shown some visuals. It was decided in the sixth validity meeting that the student be shown all the alternative solutions in writing so that he can choose one. In Week 8, while studying the reasons why the Central Asian states collapsed, the student was able to identify the solutions to the question, "What could the rulers do to prevent the collapse of their states?" through explanations. Using clues from the visuals, the student speculated that "They practiced Manichaeism. They did not make weapons. They did not fight wars. They should have a lot of weapons. They should fight wars. They should strengthen their country." The suggested solutions were written down. The student was asked which one of the solutions was most effective but he was unable to answer the question. When the question was paraphrased as "What could they have done to prevent the collapse of their state?" the student came up with the answer, "They could get stronger and fight."

In Week 14 of the research, while studying climate and the flora, the student was asked "How does climate change affect the flora?" After thinking for quite some time, the student replied, "Heat, a lot of rain." The student was also able to answer the question, "What is the most significant impact of the diversity in the flora?" as "People can eat a variety of fruits and vegetables" by using the information on the visuals.

Discussion

Social Studies education encompasses a learning process in which different disciplines converge and associate (Grant et al., 2017). Problem-solving skills, as an important part of Social Studies education and a skill crucial in the preparation of the young individual for the future, require the use of intellectual skills, organizing information and using cognitive strategies (Gagne, 1985). Therefore, it is possible to say that the learning process will become even more complicated when Social Studies education is combined with problem-solving strategies. As a matter of fact, it is seen in the current research that the participating student has difficulty finding solutions to problems that are combined with Social Studies content. Based on the evaluation of the results obtained after fourteen weeks of intervention, it can be said that the student's development in problem-solving stages varies. Some of this variation can be accounted for by the students' limitations in terms of language skills and information experience related to the Social Studies course content (Marsharck & Everhart, 1999). Another reason may be that the student has difficulty transferring past information to the current situation (Hwang, et al 2015). In coping with these difficulties, it may be useful to first ensure that the student with hearing loss acquires knowledge and experience on the subject, and then to teach strategies to remember and use past information (Akay, 2020).

Research focusing on hearing students in Social Studies education show that problem-solving skills contribute to the development of self-learning and reasoning skills and to linking knowledge with real life (Altun & Emir, 2005; Deveci, 2002). It is possible to claim that the hearing-impaired participant gained awareness in using problem-solving steps and reasoning during the current research. However, the research findings also point out that supplementary education for the participant in self-learning should be maintained. Students with hearing loss need direct teaching and repetition of instructional strategies more than their hearing peers (Kyle et al., 2016). It was observed that the participating student in this research had difficulty using the problem-solving skill he had learned before to solve the new problem. This finding appears to be similar to Luckner's (1992) research results. Luckner (1992) compared the

problem-solving skills of students with and without hearing loss and determined that the hearing group was able to solve the problems with less effort and in less time compared to the hearing-impaired group. Similarly, test results in Laurent's (2014) research, showed that the performance of students with hearing loss was lower and that each child had weaknesses and strengths in different problem-solving areas. Similarly, it was observed in the current research that the participant had difficulty at different stages of problem-solving in different sessions.

It is emphasized that overcoming the challenges experienced in problem-solving skills requires the children to encounter problems that they can solve with their own experiences (Bishnoi, 2017; Riecken & Miller, 1990). It is also evident that visual materials facilitate the development of the problem-solving skills of students with hearing loss (Nikolaraizi et al., 2013). In this research, the participant was given examples of his own experiences when he was having difficulty in the problem-solving steps so that he could understand the problem and determine the solutions. In addition, the subject was enriched with visual materials so that the student could experience new information. Laurent (2014) emphasizes that teachers working with students with hearing loss should act as models in the process of accessing information and acquiring strategies in Social Studies education. In this research, supplementary education practices were carried out in a one-on-one environment in accordance with the needs of the participating student, and the researcher acted as a model while carrying out case studies. It was stated in the last interview by the Social Studies teacher that the student benefited from the interventions, showed improvement in understanding and using concepts, tried to establish a cause-and-effect relationship to find solutions to problems, and displayed more willingness to participate in the lesson. Despite this positive feedback, when the evaluation results were examined, it was seen that the student could not transfer the problem-solving strategy he had learned earlier to the new topic and needed to experience new information about each new topic.

The inclusive educational philosophy and the positive effect of cochlear implant use on oral language skills have accelerated the participation of students with hearing loss in general educational environments. The success of cochlear implant applications depends on the conditions of early intervention. Primary among these conditions are the early diagnosis and early equipment of the child with the hearing aids that maximize the benefits. The participating student in this research was diagnosed at the age of 2 months, started using hearing aids at the age of 3 months, and a cochlear implant was applied to one ear at the age of 18 months. He performed close to his hearing peers in oral language skills and was placed in an inclusive environment. The teacher stated in the interview that the student did not experience any problems in oral language skills and classroom interaction, but experienced difficulties in accessing and interpreting information in Social Studies education. One of the possible reasons for this difficulty can be explained by the fact that Social Studies requires critical thinking and problem-solving skills, in addition to oral language skills (Hawkman, et al 2015; Abdu-Raheem, 2012). Competence in oral language skills facilitates the development of literacy and other academic skills but does not guarantee success in all academic skills (Karasu, 2020). The current research, in which a student with a cochlear implant who benefits from early intervention conditions and performs close to his hearing peers in oral language skills still appears to need supplementary education in the development of problem-solving skills attests to this claim.

Limitations and Suggestions

The scope of this research was limited to a student with a cochlear implant in an inclusive environment, a Social Studies teacher, and the secondary school sixth-grade, first-semester Social Studies content. Due to the nature of action research, these results cannot be generalized. In the current research, the development of problem-solving skills was carried out for Social Studies education in accordance with the needs of the student. Simultaneous implementation of similar instructional practices for other academic skills such as literacy, mathematics and science can contribute to the development of the students' problem-solving skills. The results suggest that the need for supplementary education for the student's problem-solving skills continues. A long-term and all-encompassing problem-solving strategy education for all the courses can enable the student to use the steps of this skill in different contexts. Supplementary education for problem-solving in the current research was carried out in a one-on-one environment based on the individual needs of the student. The student's use of the information acquired in the one-on-one environment can be facilitated further for use in the classroom environment by monitoring his participation in group activities in the classroom, observing the teaching techniques and strategies used by the teacher, and mentoring the teacher if necessary.

Conclusion

It is expected that children with hearing loss, whose oral language skills have improved with cochlear implants and early education opportunities, will perform similarly to their hearing peers in academic skills. Despite the improvements in oral language skills, students with hearing loss who use cochlear implants show lower performance than their hearing peers in academic areas such as reading, writing, social studies, science and mathematics in the general education environment and may need supportive education. In the current study, the difficulties of a student with cochlear implant in an inclusive environment in problem solving skills in social studies were revealed. Some of these difficulties are thought to stem from the student's lack of experience with problem solving strategies, while others stem from the lack of the necessary content knowledge to use these strategies. Based on the findings of the current research, it can be claimed that through the provision of authentic activities, determining teaching strategies in accordance with student needs and using direct teaching techniques in the Social Studies courses, the student with hearing loss has gained awareness of the problem-solving process and has made attempts to use problem-solving skills, but the need for supplementary education related to this skill continues.

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