

Students Using Cochlear Implants in Inclusive Environment: The Process of Editing and Revising Written Products

Kubra Ozmen^a, H. Pelin Karasu^{b,*}, Elif Akay^c

Received : 6 March 2025
Revised : 11 June 2025
Accepted : 30 June 2025
DOI : 10.26822/iejee.2025.392

^aKubra Ozmen, Ministry of National Education, Türkiye.
E-mail: kubraozmen@gmail.com
ORCID: <https://orcid.org/0000-0002-3322-0849>

^{b,*} **Corresponding Author:** H. Pelin Karasu, Anadolu University, Eskisehir, Türkiye.
E-mail: hpkarasu@anadolu.edu.tr
ORCID: <https://orcid.org/0000-0002-9612-9858>

^c Elif Akay, Anadolu University, Eskisehir, Türkiye.
E-mail: elifakay@anadolu.edu.tr
ORCID: <https://orcid.org/0000-0002-7349-6217>

Abstract

Written expressions encompass putting events, emotions, and thoughts on paper with the written symbols of a language in compliance with its rules. Even with cochlear implants, students with hearing loss who experience delays in language and academic skills face various difficulties in written expression skills. Editing and revising studies, which play an important role in the writing process in coping with these difficulties, serve to increase the quality of written products and to allow students to independently edit and review their writing. This study aims to examine the editing and revising processes of the written products by students with cochlear implant in an inclusive environment. This case study was conducted with two secondary school students with cochlear implant. Research data was collected through observations, interviews, validity and reliability committee meetings, process products, documents, materials used in the preliminary stages, written expression skills assessment forms, and writing revising taxonomy. At the end of the study, it was observed that students needed corrections such as adding, deleting, substituting and rearranging sounds/syllables/words in their written products, that these corrections were made in suffixes and sentences as units, and that students needed various auditory and visual clues while revising their writings. Based on the research findings, it was concluded that the students with cochlear implants who participated in the study benefited from the process of editing and revising their written products and that the experiences gained in the process contributed to the quality of the written products.

Keywords:

Cochlear Implant; Editing and Revising Process; Inclusive Environment; Students With Hearing Loss; Writing Process

Introduction

Students with hearing loss tend to experience delays in language skills development compared to their hearing counterparts. Early intervention, along with cochlear implant, which have a positive impact on oral language skills development, plays an important role in the mitigation of this delay. These improvements in oral language skills have led to the placement of students with hearing loss in inclusive environments and the expectation that they will be able to perform close to their hearing peers in



www.iejee.com
ISSN: 1307-9298

2025 Published by KURA Education & Publishing.
This is an open access article under the CC BY-NC-ND license. (<https://creativecommons.org/licenses/by/4.0/>)

reading and writing skills. However, existing literature underlines that the increased intelligibility of speech and improved listening skills that cochlear implant offer do not guarantee academic success, and students with hearing loss in inclusive environments still lag behind their hearing peers in literacy skills and that they require support education (Akay, 2023; Arfe et al., 2016; Mayer et al., 2016; Wolbers, 2008; Yaşamsal et al., 2013). This study determines the areas that require correction in the written products of such students and examines the editing and revising processes to support their development of written expression.

Writing is a means of communication where individuals use symbols within the rules of a language to express their emotions, thoughts and experiences. Educational programs aim to incorporate writing skills because written expression plays a significant role in academic success and correlates greatly with listening, speaking, and reading skills while also contributing to the development of other skills (Arfe et al., 2016). It follows that a systematic approach that accommodates the development of writing skills is strongly advised in educational environments and that this approach carries significance in the improvement of linguistic, academic, and social skills of students with hearing loss just as with students with typical development (Dostal & Wolbers, 2014; Dunn et al., 2022). The writing process consists of stages starting from selecting the topic that constitutes the content of the text, drafting, writing the content, editing and revising the text and publishing it (Kolb et al., 2013). These stages not only support the development and organization of content and opinions but also contribute to the formation of syntactically accurate sentences, accurate spelling, correct use of vocabulary in context, full and correct spelling of suffixes, correct use of punctuation and rules of the language which altogether determine the quality of the written product (Dunn et al., 2022; Grenner et al., 2022; Kolb et al., 2013). After drafting the text, comes the editing and revising stages, which allow the integration or removal of opinions, self-revision and redrafting (Dostal & Wolbers, 2014). Students with typical development who are more competent in language skills are able to identify and act on problem areas such as sentence structure, vocabulary use and spelling as areas that affect the quality of the text and need changing in the editing and revising stages. However, for students with hearing loss, who lag in their linguistic and academic skills, the production of a written text and the editing and revising of the text is a challenging task (Dostal & Wolbers, 2014; Dunn et al., 2022). Therefore, working on the written product gives the student the opportunity to rearrange the content of the writing and correct errors in letter-sound relationships, syntax, semantic and pragmatic in his/her own writing under the guidance of the teacher (Grenner et al., 2022; Karasu, 2014).

Research focusing on the writing skills of students with hearing loss compare the performance of these students with their hearing counterparts, examine the development of the written products for various age groups, assess reading comprehension and written expression skills and the impact of early implants in writing skills (e.g. Antia et al., 2005; Arfe et al., 2016; Bell et al., 2019; Çizmeci & Çiprut, 2018; Efe & Karasu, 2017; Geers & Hayes, 2011; Oliveira et al., 2020; Quick et al., 2018; Yaşamsal et al., 2013). However, there has been no research on the writing process of students with hearing loss on the national level and international literature is also limited in this area. One of the few international studies in the area focuses on the editing and revising process of the written products of students with cochlear implant (Aberth & Warfel, 2021) while the others study the efficiency of writing processes and interactive writing studies (Bajarh, 2019; Milham, 2020; Wolbers, 2008). Aberth and Warfel (2021) study the contribution of a program on self-regulatory strategies on the writing skills of a student with cochlear implant. They determine that interventions toward self-regulation offer important benefits in the revision of the written product and potentially improve writing skills as well as reading comprehension skills. Research on interactive writing (Wolbers, 2008) underlines that students benefit from the practice at the word-definition level at primary school and the reorganization and revision level at secondary school. Similarly, Bajarh (2019) highlights that a balanced and interactive writing task reinforces writing skills significantly. Milham's study (2020), on the contribution of the writing process to the writing skills of students with hearing loss, finds that students benefit from their experience in creating written products and that they use the stories shared in the process to create their own content. An examination of the results of these studies reveals that the writing process makes a significant contribution to the written products of students with hearing loss. However, there is still a need for research to clarify the areas where students with cochlear implant make mistakes and how the editing and revising processes can be applied. The present study can be useful in determining the areas where students with hearing loss require help and developing support education plans to help them. Moreover, this study may offer insights into the difficulties that students with cochlear implant experience in writing tasks in inclusive environments and the benefits of editing and revising processes in the writing process.

This study aims to examine the editing and revising processes of the written products of students with cochlear implant in inclusive environments. With these in mind, the study aims to answer questions such as (a) What kind of corrections have been made to the students' written products? (b) How were the editing and revising processes carried out? (c) How

did the students' performance in writing improve in the process?

Methodology

Research Design

This study used a qualitative case study design. A case study is a research design that aims to examine events, situations, individuals, environments or processes in depth on the basis of 'how' and 'why' questions (Yin, 2014). Case studies can be classified according to their purpose and the units of analysis. This research is a holistic single case study because of the determination of a single analysis unit in which the stage of reviewing and revising the written products of two students with cochlear implant is covered, and a descriptive case study as it intends to describe in detail the process of reviewing and revising written products.

Participants

The participants of the study are two students with cochlear implant who are in an inclusive environment, a researcher, parents of the students, a Turkish Language teacher and members of the validity committee.

Students have been chosen through criterion sampling as in purposive sampling methods. These criteria are as follows: students should be in inclusive educational environments, students should not have accompanying inadequacies besides hearing loss, students use cochlear implant, students should be in the fourth grade or later grades as free writing studies to improve writing skills start at this level (Ministry of National Education [MEB], 2020). Two students who met these criteria were included in the study. The demographic, audiological and educational background of the participants is shown in Table 1.

Table 1
Demographic, audiological and educational background of the students

Students	Beyza	Yunus
Grade	6	6
Calendar age	11;6	12;1
Hearing aids	Right	CI*
	Left	HA**
CI age (years, months)	1;5	1;9
Hearing aid use before CI (months)	6	3
CI use (months)	122	124
Beginning of inclusive education	4;2	3;9

*CI: Cochlear Implant
**HA: Hearing Aids

As seen in Table 1, both participants are in secondary school and started using hearing devices at an early age. In the meetings with the parents, it was found that Beyza used her hearing device and the cochlear

implant actively and without breaks whereas Yunus used it only in intervals as the device frequently broke down.

Yunus and Beyza are in different classes in the same school and their teacher has 17 years of experience in her job. The teacher has not received in-service training on the education of children with special needs. Beyza's parents are primary school graduates. The mother is a housewife, and the father is a worker. Two of Beyza's six siblings are hearing impaired. Yunus's mother is a primary school graduate and a housewife, and his father is a secondary school graduate who is a laboratory technician. Yunus has one other sibling who is also hearing impaired. Both children's parents have said that they communicate verbally at home with all of their children.

The researcher graduated from Audiometry in 2015 and the Department of Teaching of the Hearing Impaired in 2019. She has been working as a special education teacher at a primary school affiliated with the Ministry of Education since 2020. The committee consisted of two specialists with 26 and 28 years of experience in assessment and qualitative research in the field of the development of literacy in students with hearing loss.

Data Collection Techniques and Tools

Case studies require multiple data sources to attain reliability and validity (Yin, 2014). In order to thoroughly examine the editing and revising processes of the written products, the researcher used (a) observations, (b) interviews, (c) validity committee meetings and reports, (d) process products, (e) documents, (f) materials used in the preliminary stages of writing, (g) written expression skill assessment form and (h) taxonomy of revising written product.

- a. Observations that provide researchers with first-hand information can be conducted directly or as participant observers. Since the researcher conducted the editing and revising processes herself, she acted as a participant observer. In addition, video recordings of the preliminary preparation work, the writing process of the written product, and the editing and revising processes were taken in order to monitor the preliminary stages, to ensure that the editing and revising processes are carried out as planned, to control the practitioner's compliance with certain rules during the writing process and correcting the student's writing, and to perform reliability checks.
- b. Semi-structured interviews before, while and after the study conducted with the parents and the teacher were also recorded on audio. In these interviews, the teacher was asked for her opinions on the students' attitude toward writing tasks and the writing process, while the parents were asked questions about the students' use and production of written materials.

- c. During the entire research process, the materials and application plans used in the preliminary preparation study were examined at the 14 validity meetings held regularly every week, video recordings of the preliminary preparation study, writing phase and editing and revising applications were watched, interview transcripts and scores of written products were checked.
- d. Process products consist of written products obtained after the writing process with the plans containing the applications in the editing and revising processes with the preliminary preparation. The plan used in the preliminary study consists of an introductory sentence explaining the application, questions to be asked about the material, and possible situations for student participation during the application. Stages in the editing and revising processes have been chosen to meet the student's needs for word or sentence-level correction. Written products were obtained by asking the participants to write a story after the preliminary stage.
- e. Documents in the research include the Student Information Forms which show the audiological, demographical and educational background of the students, and hospital files including their audiograms, their age when they started using cochlear implant and information about their hearing devices.
- f. Preliminary studies enable students to recycle their knowledge and experience, and facilitate the use of language for a variety of functions. The researcher in this study shared single and sequential cards with the students and explained the story before asking them to write their version. Six single and six sequential cards were used in odd and even weeks throughout the study.
- g. The written expression skill assessment form, whose validity as an evaluation tool has been confirmed in advance, consists of four main parts: the title, the order of expression, the richness of expression and compliance with the rules of writing. Out of a hundred points, each part is assigned 3, 51, 24 and 22 points respectively (Çizmeçi & Çiprut, 2018; Efe & Karasu, 2017).
- h. Taxonomy of revising written product is used to monitor the editing and revising processes to evaluate the written products of the students. Originally developed by Faigley and Witte (1981), the taxonomy was later expanded by Crawford et al. (2008) and then adapted by Karasu (2014) to be used in the assessment of the written products of students with hearing loss. It enables the researcher to examine the units that require correction and determine the type of correction in writing assessment. The type of correction encompasses various levels such as sound, syllable, and suffix changes, as well as additions or omissions to and from words, replacement of words, reorganization, rules of writing, merging and expanding. The units of correction include sounds, syllables, suffixes, words, clauses, sentences, multiple sentences, paragraphs and punctuation marks. As for the type of correction, the researcher

checks the extent to which the student performs self-revision without assistance, and with visual or verbal clues.

Research Environment

The research has been conducted at a state school affiliated with the Ministry of National Education in a separate class allocated to this study by the school administration. In one-on-one sessions, the researcher sat on the side of the student's ear with the cochlear implant. All sessions were carried out with the teacher's guidance not to disrupt the regular schooling program of the students.

Role of the Researcher

The researcher assumed a participant observer role in line with the objectives of the qualitative research (Yin, 2014). Thereby, the researcher carried out needs analysis, collected, analyzed and interpreted the data. In the process of obtaining, reviewing and correcting the written product, the researcher prepared the materials to be used in the preliminary writing stage, planned and implemented the tasks and evaluated the products.

Data Collection Process

The data has been collected over a twelve-week period in the 2022-2023 academic year. After the participants were determined, the researcher met with the teacher and the parents, and carried out the one-on-one sessions with the students on separate days. At the opening stage, the researcher shared the designated card of the week after an introduction. Then the student was asked to tell the story following questions on the main theme encouraging their contribution. Finally, the student was asked to write a story on the events that were laid out. There were no interventions or any time limits set for the task. On finishing the story, the student was asked to revise what he/she had written and make any corrections they wanted. Upon completion of self-revision and revising, the student and the teacher moved on to review and correct the text together. The preliminary study, the writing stage and the editing and revising stages were carried out on the same day. Editing and revising stages took 10-20 minutes with Yunus and 14-19 minutes with Beyza.

Trustworthiness

In order to ensure trustworthiness, data has been collected longitudinally, systematically and thoroughly, and all the materials in the preliminary stage, plans and the pre-writing stages, the editing and revising stages and the grades for the written product have been checked on a weekly basis by the reliability committee. The content validity of the questions asked

during the interviews with the parents and the teacher has been verified by a field expert who works with students with hearing loss. The voice recordings have been transcribed and the transcriptions have been confirmed by the interviewees. For dependability, 50% of the written products were scored by a field expert with 25 years of experience with students with hearing loss, and 98% agreement was achieved. For confirmability purposes, 50% of the editing and revising applications for both students were monitored by the field expert, and it was confirmed that the applications were carried out as planned.

Data Analysis

Data can be analysed during data collection, descriptively or by content analysis in case studies (Yin, 2014). Data in this research has been analyzed descriptively. Based on the research objective and research questions, the types of errors in students' products, the units of error and types of correction have been described within the framework of the revising taxonomy, while improvements in the written expression grades have been described according to features checked in the evaluation process.

Research Ethics

This study has been approved by the ethics committee of the university (22.11.2022/440804) and was granted a research permit by the Ministry of Education (20.12.2022/E-45468433). The families and the teacher gave their written consent to participate in the study. Research findings were shared on demand with the families and the teacher, and the students were given aliases.

Results

Research findings are given below. What kind of corrections have been made? During the analysis, the products have been examined under (a) the type of correction and (b) the unit of correction as determined by the taxonomy.

- a. Type of correction: Types of error correction for the written products are shown in Table 2.

Table 2 shows that the types of errors in Beyza and Yunus' written products are different and therefore they need different types of correction. Beyza needed corrections in the types of deletion, substitution and addition of sounds/syllables/fixes or words. With Yunus, corrections in the types of reorganization and expansion were made. This finding shows that Beyza can organize the content of the writing, narrate the events in a certain order and express her thoughts in writing within the framework of the rules of the language, while Yunus needs more support in creating the content of the writing, organizing his thoughts and using the language. Another striking finding is that Beyza needs corrections in the types of addition of sounds/syllables/fixes or words more than other types of correction. Students with hearing loss who experience delays in language skills reflect their use in the spoken language in the use of some elements that make up the syntax of the language and may need corrections in the type of addition within the sentence. The high number of errors in Yunus' written expressions regarding letter-sound relationships, syntax, semantic and pragmatic has created a need for correction in the form of reorganization and expansion in his writings.

Table 2
Types of correction

Weeks	Sound/syllable/ suffix or Word Deletion		Substitution a sound/syllable or word		Adding a sound/ syllable/suffix or word		Reorganization		Spelling Rules		Combining		Expansion	
	Beyza	Yunus	Beyza	Yunus	Beyza	Yunus	Beyza	Yunus	Beyza	Yunus	Beyza	Yunus	Beyza	Yunus
	Correction	%	Correction	%	Correction	%	Correction	%	Correction	%	Correction	%	Correction	%
1	-	-	1	14.29	6	85.71	-	-	4	100	-	-	-	-
2	7	30.43	2	8.70	9	39.13	-	-	6	63.64	5	21.74	1	9.09
3	3	14.29	2	9.52	15	71.43	-	-	9	69.23	1	4.76	-	-
4	7	26.92	2	7.69	14	53.85	-	-	5	71.43	3	11.54	-	-
5	4	22.22	3	16.67	5	27.78	-	-	11	68.75	6	33.33	-	-
6	5	20.83	6	25.00	9	37.50	-	-	7	70.00	4	16.67	1	10.00
7	2	20.00	1	10.00	3	30.00	2	20.00	7	33.33	2	20.00	8	38.10
8	1	5.55	-	-	14	77.78	-	-	6	66.67	3	16.67	-	-
9	7	25.92	-	-	10	37.04	-	-	9	69.23	10	37.04	-	-
10	2	6.06	-	-	15	45.45	-	-	15	75.00	8	24.24	2	10.00
11	1	3.85	-	-	12	46.15	-	-	12	54.55	9	34.62	4	18.18
12	2	8.33	-	-	17	70.84	-	-	10	76.92	2	8.33	1	7.69

b. Unit of Correction: According to the taxonomy the units of correction were sound, syllable, suffix, clause, sentence, multiple sentences, paragraph and punctuation. Units of correction on the students' written product in this assessment are shown in Table 3.

use of punctuation marks became more necessary with the enrichment of the content in Beyza's written products, and Yunus started to use punctuation marks in the last week of the practices.

How was the editing and revising process carried out?

In the units where the error was corrected, it is seen that Beyza needs more additional corrections along with sound/syllable and word corrections (Table 3). In Turkish, each addition to a word has the feature of changing the meaning. This feature affects the meaning of the word as well as the syntax accuracy of the sentence. This finding, consistent with the findings obtained in the type of error correction (Table 2), shows that Beyza needs more support in using the morphological elements of the language. Since Yunus had difficulty in creating the content in his written products, needed to reorganization the writing and expand the content, each sentence in the units where the error was corrected had to be corrected. In the use of punctuation marks, which constitute the mechanical element of writing, it is seen that the

In the one-on-one sessions carried out with both students throughout the written product evaluation process, the correction technique in the 'written product evaluation taxonomy' has been detailed on a weekly basis as follows (Table 4).

In terms of error correction methods, it is seen that both students need the teacher's guidance at different levels (Table 4). While Beyza needed written cues to correct her errors in the first weeks, the frequency of noticing her errors and correcting them without assistance increased in the following weeks. This finding shows that editing and revising activities carried out in a one-on-one environment under the guidance of the teacher increased the student's awareness of the morphology, semantics, syntax and

Table 3
Unit of correction

Week	Sound/Syllable Correction		Suffix Correction		Word Correction		Sentence Correction		Clauses Multiple Sentences Paragraph Correction				Punctuation					
	Beyza		Yunus		Beyza		Yunus		Beyza		Yunus		Beyza		Yunus			
	Correction	%	Correction	%	Correction	%	Correction	%	Correction	%	Correction	%	Correction	%	Correction	%		
1	1	14.29	-	-	6	85.71	-	-	-	-	4	100	-	-	-	-	-	-
2	2	8.69	-	-	6	26.09	-	-	9	39.13	-	-	6	100	-	-	6	26.09
3	9	45.00	-	-	9	45.00	-	-	1	5.00	-	-	-	-	1	5.00	-	-
4	6	26.09	-	-	11	47.83	-	-	3	13.04	-	-	-	-	3	13.04	-	-
5	1	8.33	-	-	5	41.67	-	-	4	33.33	-	-	-	-	8	100	2	16.67
6	6	30.00	-	-	5	25.00	-	-	4	20.00	-	-	-	-	6	100	5	25.00
7	2	22.22	-	-	4	44.44	-	-	2	22.22	-	-	-	-	7	75.00	1	11.12
8	3	17.65	-	-	4	23.52	-	-	3	17.65	-	-	-	-	6	100	7	41.18
9	4	22.22	-	-	4	22.22	-	-	6	33.34	-	-	-	-	8	100	4	22.22
10	3	12.00	-	-	9	36.00	-	-	8	32.00	-	-	-	-	14	100	5	20.00
11	1	5.00	-	-	10	50.00	-	-	3	15.00	-	-	-	-	12	42.86	6	30.00
12	2	9.09	-	-	11	50.00	-	-	5	22.73	-	-	-	-	10	100	4	18.18

Table 4
How the mistake is corrected

Week	Identifying the Mistake and Correcting It Without Assistance				Self-Revision When the Mistake is Pointed Out				Revision Through Explanation				Revision by Looking at the Corrected Version			
	Beyza		Yunus		Beyza		Yunus		Beyza		Yunus		Beyza		Yunus	
	Correction	%	Correction	%	Correction	%	Correction	%	Correction	%	Correction	%	Correction	%	Correction	%
1	3	42.85	-	-	1	14.29	-	-	1	14.29	-	-	2	28.57	4	100
2	15	65.21	-	-	-	-	-	-	6	26.09	-	-	2	8.70	6	100
3	3	14.29	-	-	2	9.52	-	-	9	42.86	-	-	7	33.33	8	100
4	15	57.69	-	-	2	7.69	-	-	7	26.93	-	-	2	7.69	9	100
5	5	27.78	-	-	2	11.11	-	-	7	38.89	-	-	4	22.22	8	100
6	10	41.66	-	-	4	16.67	-	-	6	25.00	-	-	4	16.67	6	100
7	2	20.00	-	-	4	40.00	-	-	4	40.00	-	-	-	-	7	100
8	6	33.33	-	-	5	27.78	-	-	7	38.89	-	-	-	-	6	100
9	16	59.26	-	-	2	7.41	-	-	7	25.92	-	-	2	7.41	8	100
10	12	36.36	-	-	3	9.09	-	-	14	42.42	-	-	4	12.13	14	100
11	9	34.61	-	-	6	23.08	-	-	11	42.31	-	-	-	-	12	100
12	10	41.67	-	-	4	16.66	-	-	10	41.67	-	-	-	-	10	100

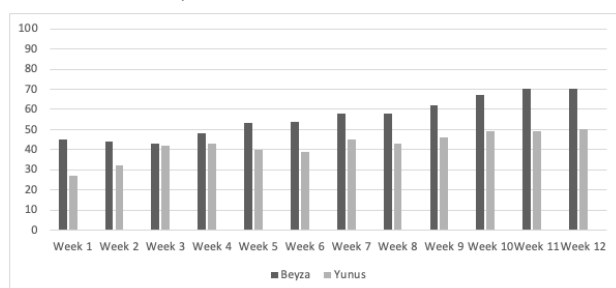
pragmatic of the language. Yunus, on the other hand, needed the teacher's guidance and written cues in all written products. This situation can be explained by the fact that Yunus needs support not only for editing and revising of written products but also for the development of his oral language skills, which form the basis of reading and writing skills.

How did the students improve in their written expression performance?

The written products obtained throughout the semester have been assessed according to the Written Expression Skill Assessment Form. Total scores of both students for written expression skills are shown in Graph 1.

Graph 1.

Total written expression score



Graph 1 shows that Beyza scored lower than 50 in the first four weeks and then her grades in written expression improved. In the interview dated 15.02.2023, the parents were asked if Beyza asked for help in her writing assignments, to which the father replied, "I think she asks for help to form sentences" and the mother replied "Sometimes she thinks she made a mistake and wants help to check the spelling of the words" (15.02.2023, Interview Record 444"). In the last interview dated 30.05.2023, the parents were asked if they saw any progress in their daughter's written expression skills and if they did, what they were. The parents replied, "Of course, we do. She used to make a lot of mistakes in the use of suffixes. She can now use them correctly. Even while speaking she would omit suffixes. She uses the suffixes more accurately in her speech now (30.05.2023, Interview Record 2'05"). In the first meeting with the teacher, dated 16.02.2023, the teacher was asked "What can you say about the written expression performance of your students with hearing loss?" She answered with reference to their motor skills in writing and said "They write beautifully. They care for their writing more than normal students." When the question was rephrased as "What do you think of their performance in terms of story or essay writing?" She responded with reference to the length of the texts they produced and said "... Beyza can write half a page on a large-size notebook (16.03.2023 Interview Record 3'45"). In the last interview dated 31.05.2023, she replied to the question "Do you see any improvement in Beyza's writing expression skills?"

as "I can say that she is more confident now. She is more willing to participate in the writing tasks in class now. I believe she has greater confidence in herself" (31.05.2023, Interview Record 3'40").

In the interview dated 15.02.2023, Yunus's mother was asked her opinions on his written expression skills, to which she replied, "He doesn't like writing because he cannot form sentences. I help him by dictating words syllable by syllable. I correct his sentences so that he can put them in his writing. He has a very limited vocabulary range. He can only write the words he has memorized (15.02.2023, Interview Record 4'20"). The last interview dated 01.06.2023 was conducted with Yunus's father. The father was asked "Do you see any improvement in Yunus' written expression skills? If so, what are they?" And the father replied, "There is a world of differences between the beginning of the semester and now. He can now put the events he sees into writing. He can write words more accurately. And he is more willing to tell us about things (01.06.2023, Interview Record 1'36"). In the first interview with the teacher, dated 16.02.2023, the teacher said she could not do writing tasks with Yunus and when she dictated words, Yunus was unable to write them accurately. In a later interview dated 31.05.2023, the teacher acknowledged that "Yunus's written expression improved greatly in terms of content. He still has a lot of work to do in terms of the rules of writing. He tends to misspell certain words and suffixes. Still, he is more willing to write compared to the past" (31.05.2023, Interview Record 2'40").

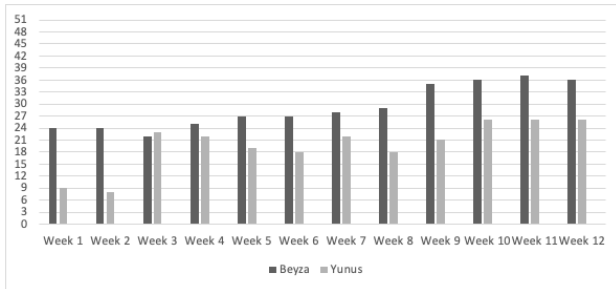
The total written expression score consists of the points taken from the sections (a) title, (b) narrative layout, (c) narrative richness and (d) compliance with spelling rules. In order to determine the students' strengths and weaknesses in written expression, their performances in these departments were examined during the intervention process and the findings are presented below.

a) Title: There were no titles in Beyza's writings in the first and third weeks. In Weeks 2, 4, and 9, Beyza used titles in her writing, but the titles were irrelevant to the topic. In the remaining weeks, Beyza managed to use titles that were directly related to her topics in writing. As for Yunus, he had a title for all his writings except for that of Week 1. He used a title for all his texts but failed to connect the title with the topic in the first five weeks. Yunus managed to put a relevant title that covered the topic of all his writings in the remaining weeks.

b) The Order of Expression: Another feature in the Written Expression Skill Evaluation Form is the narrative layout. Evaluated over 51 points in the evaluation form, the narrative layout consists of three parts: introduction, development and conclusion. Students' scores in the narrative layout section are presented in

Graph 2.

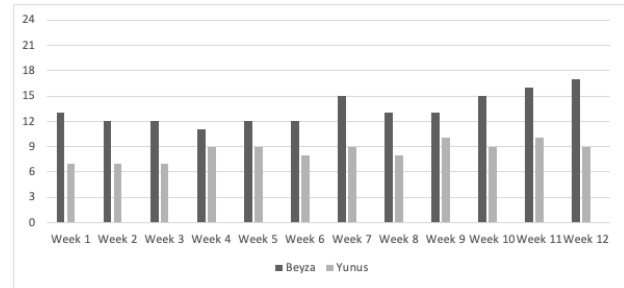
Graph 2.
Narrative layout points



As can be seen in Graph 2, Beyza received the lowest score from the written product obtained in the third week and the highest score in the eleventh week in the narrative order. It is observed that Beyza has an introductory paragraph in all her products except the third week. She received 2/5 points in the first three weeks for the clear presentation of the subject by explaining the subject and the main idea. In the eleventh and twelfth weeks, she achieved the highest score in the evaluation process in this feature by receiving 4 points from these features. It was seen that she did not write a paragraph for the development section for the first four weeks, but wrote one in accordance with the flow of events and context from the fifth week onwards. In the narrative layout, the ability to 'present the subject/main idea clearly' is evaluated over 10 points. Beyza received 4 points from this feature until the sixth week, and she received 8 points from the written product obtained in the last week. As for the conclusion section, it was seen that she did not write a conclusion paragraph until the fifth practice, and although she intended to write the paragraph in structure in the following weeks, she had difficulty bringing the events to a conclusion in terms of content. In Yunus's written products, it was seen that the first two weeks' scores were significantly lower in the narrative layout section compared to other weeks. Examination of the products showed that Yunus could not score in the part on 'the presence of subordinate ideas that support the main thought' and 'writing events, feelings and thoughts with logical consistency and sequence' in this section. Yunus tried to write on the topics for the first two weeks in a few sentences mentioning a single event in short sentences.

c) The richness of expression: Another feature in the written expression skill evaluation form is the richness of expression. The richness of expression, evaluated over 24 points in the evaluation form, assesses the accuracy in writing and using words correctly and in place, the accuracy of sentences and avoiding word repetition in explaining thoughts. The scores related to the richness of expression in the written products of the students are presented in Graph 3.

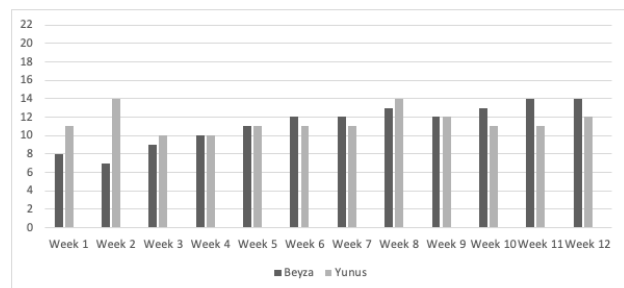
Graph 3.
Narrative richness scores



As can be seen in Graph 3, Beyza received the lowest score in the narrative richness section from the written product obtained in the fourth week. In this written product, it has been observed that Beyza has difficulty in spelling words and syntax of sentences. Yunus, on the other hand, received the lowest score in the narrative richness section from the written products obtained in the first three weeks. It is observed that Yunus has difficulty using suffixes according to syntax in his writings, makes mistakes in spelling words and tends to use the same words repetitively.

d) Compliance with the spelling rules: In the section on compliance with spelling rules evaluated over 22 points in the evaluation form, the layout, the legibility of the writing, the correct use of punctuation marks, the accuracy of upper and lowercase letter usage and paragraph layout characteristics are scored. The scores in the section on compliance with the spelling rules in the written products of the students are presented in Chart 4.

Graph 4.
Scores for compliance with spelling rules



As seen in Graph 4, Beyza received the lowest score from the written product of the second week and the highest score from the written products obtained in the eleventh and twelfth weeks from the spelling compliance section. The 'correct use of punctuation marks' which is important in compliance with spelling rules, is evaluated over 10 points. Beyza received the lowest score from this feature in the first and second weeks, and the highest score in the eleventh and twelfth weeks with 5 points. It has been observed that Beyza puts a period at the end of each sentence in her written products, but has difficulty using commas,

speech lines and quotation marks. On the other hand, Yunus received the lowest score from the written products in the third and fourth weeks and the highest score in the second and eighth weeks in compliance with the spelling rules. It has been observed that Yunus does not put a period to the end of some sentences, the use of commas is limited, and he does not use punctuation marks other than these two.

Conclusion

This research aims to delve into the editing and revising processes of the written products of two students with cochlear implant in an inclusive education environment. An examination of the revising process reveals that both students make similar mistakes except for the components which focus on syntax accuracy and error correction. In Beyza's case, the corrections required were often at the sound, syllable, suffix and word levels, whereas Yunus seemed to require sentence-level corrections in the entire text. It seems that this diversity in the type and number of errors in the written products of these students who had cochlear implant in the early stages of life and were in the same educational environment is reflected in their performance in organizing their thoughts, determining relationships between events, and expressing their thoughts in syntax-correct sentences. Although the type and unit of correction that the two students need assistance with are different, these findings are parallel to other research findings in that students with hearing loss have difficulty in editing the content of the product, the accuracy of sentences, the richness of expression and compliance with spelling rules (e.g. Bajarh, 2019; Grenner et al., 2022; Mayer, et al., 2016; Milaham, 2020; Straley et al, 2016; Yaşamsal et al., 2013).

Various studies state that one area where students with hearing loss need the greatest assistance is the use of derivatives and inflections (Antia et al., 2005; Bajarh, 2019; Karasu, 2014). Derivatives and inflections along with syntax accuracy directly affect the accuracy of the expression. These findings demonstrate that Beyza needs more correction in the suffixes related to tenses and in suffixes related to orientation, while Yunus has difficulty forming sentences by juxtaposing words with suffixes in accordance with the syntax. Based on the results of other studies and current research findings, it can be said that there may be various units that need correction in the written products of students with hearing loss due to the delay experienced in the acquisition of other language skills. Their individual differences, in other words, audiological, linguistic and educational backgrounds affect the type and units of errors.

Another finding of the current study is that, similar to other research findings, students did not have difficulty spelling words they frequently use in daily

life. However, students were able to use words they did not encounter frequently when sharing events verbally, but they had difficulty with both spelling and syntax in written expression (Antia et al., 2005; Quinck et al., 2019; Straley et al., 2016). Pre-writing studies play a significant role in overcoming these challenges as well as difficulties concerning written expression skills such as creating the content, organizing ideas, logical flow and sequencing events, and accuracy of syntax and word choice (Crosson & Geers, 2001). Researchers in this study used sequential and single cards demonstrating the content in the pre-writing studies. When the written products are examined, it could be observed that students benefited from the stories used in the preparation stage and were able to create the content of the products as also suggested by the research results of Miliham (2020). Assigning writing tasks without pre-writing studies may cause students with hearing loss, who experience delays in language skills, to have difficulty in various elements of written expression, and creating content, which may hinder their actual performance in written expression (Crosson & Geers, 2001). Therefore, audio-visual aids such as story books, sequential cards, single cards, photos, films, and documentaries that can enable the demonstration of the experience can be used in the pre-writing stages in order to determine the actual strengths and weaknesses of students in written expression (Crosson & Geers, 2001; Grenner et al., 2022).

It was observed, at the end of 12 weeks that students showed improvement in the title, narrative layout, narrative richness and compliance with spelling rules along with the total written expression score thanks to the practices employed in pre-writing. These findings are similar to other research findings in which various educational applications were made for the development of written expression skills of students with hearing loss (Aberth & Werfel, 2021; Bajarh, 2019; Wolbers, 2008). Bajarh (2019) emphasizes in his research on students with hearing loss that interactive writing activities have a positive impact on writing skills. Similarly, in the research conducted by Wolbers (2008) on balanced and interactive writing courses, it was concluded that his students significantly improved in editing and revising their writing.

The main purpose of the process of reviewing and correcting the written product is to increase the quality of the product. Editing and revising written products also play an important role in the process of these students becoming independent writers (Kolb et al., 2013). The applications listed in the 'error correction method' section in the taxonomy of writing revision of this paper include the stages starting from the student's self-identification of the error and correction with minimum help, leading to correction by reviewing. When the applications were examined, it was seen that Beyza had difficulty noticing and

correcting her mistakes at the beginning of the process, but during the process, she was able to find and correct her mistakes on her own without the help of the teacher. This finding is consistent with the results of the research emphasizing that the process of reviewing and correcting written products allows students with hearing loss to notice their mistakes and correct their mistakes by using clues about letter-sound relationships, syntax, meaning and usage (Aberth and Werfel, 2021; Bajarh, 2019; Grenner et al., 2022; Karasu, 2014). When the applications carried out with Yunus, the other participant of the study, were examined, it was seen that the student had difficulty in noticing his mistakes and correcting them without help due to the high number of syntax errors and the need to reorganization the content of the writing. Reading and writing skills are not skills that develop independently of other language skills. Therefore, it can be said that the student needs intensive listening, speaking and reading activities based on his needs, and that the writing process can support the development of language skills together with these.

Various studies have shown that starting to use a cochlear implant in the early stages of life leads to improvements in oral language skills, which can be directly reflected in reading and writing skills (Geers & Hayes, 2011; Mayer et al., 2016; Vital et al., 2013). However, cochlear implant age alone does not guarantee the development of academic skills. Audiological and educational factors such as pre-implant device use, maximum benefit from devices, family education, early education conditions and the nature of educational programs can also have an impact on academic success in subsequent years (Arfe et al., 2016; Mayer et al., 2016; Mayer & Trezek, 2018; Vital et al., 2013). Another noteworthy finding in the current study is that although both participants had implants at similar ages and attended similar educational institutions, there was a difference between their written expression performances, and the corrections they needed varied during the editing and revising of written products. Background check of the participants revealed that Beyza used both the cochlear implant and the hearing aid regularly from an early age, and her audiological evaluations and device maintenance were performed regularly, while Yunus had problems with the internal and external parts of the device at an early age and therefore could not use his device efficiently. Similarly, it has been stated in various studies that written expression performance, as well as other academic skills, may vary among students who can fully benefit from cochlear implant and students who use the device in intervals (Geers et al., 2007; Geers & Hayes, 2011; Mayer & Trezek, 2018). Based on these findings and other research results, it may be recommended to systematically evaluate the development of language and academic skills of these students who are in the

same educational environment as their hearing peers and provide support educational services for the areas of need.

As a result, in this research where the process of editing and revising the written products of two students with cochlear implant in an inclusive environment was examined, it was observed that although the written expression performances of both students varied, they benefited from the editing and revising practices performed in one-on-one sessions, they were able to share their experiences in the preliminary writing stage, they were able to write stories about the subject in accordance with these experiences, and the editing and revising process contributes to the quality of written products.

Limitations and Suggestions

This research is limited to the sequential cards and single cards used in the preparation study, which are effective in creating the content of written products. The use of different types of materials in the preparation process may affect the quality of written products. Although conducting the research with two students allows for an in-depth examination of the data, it may limit the generalizability of the research results.

Based on the research results, the following suggestions can be made for future research and practice: In future research, the contribution of various audio and visual materials to the quality of written products can be examined with longitudinal studies. Examining the entire writing process can serve to determine the areas where students with hearing loss need support in the process. In addition, there is a need for research comparing the written expression skills of students with hearing loss in inclusive environments with their peers with typical hearing and interpreting the results.

The current research results show the importance of editing and revising written products in a one-on-one environment under the guidance of the teacher. In practices carried out with students with hearing loss in educational environments, it can be recommended that preliminary preparation studies be carried out and editing and revising studies be carried out before obtaining written products. In addition, since the implementation of activities aimed at other language skills as a whole will support the development of written expression skills, it is important to carry out practices aimed at the development of all language skills with students with hearing loss.

References

- Aberth, J. R. & Werfel, K. L. (2021). The effectiveness of self-regulated strategy development instruction for improving writing abilities in a school-age child with cochlear implants: A single subject research design study. *Deafness and Education International*, 23(1), 64-82. doi:10.1080/14643154.2019.1688531
- Akay, E. (2023). Development of problem-solving skills of a student with cochlear implant in social studies: an action research. *Participatory Educational Research*, 10(6), 175-191. doi:10.17275/per.23.95.10.6
- Antia, S. D., Reed, S. & Kreimeyer, K. H. (2005). Written language of deaf and hard-of-hearing students in public schools. *The Journal of Deaf Studies and Deaf Education*, 10(3), 244-255. doi:10.1093/deafed/eni026
- Arfe, B., Ghiselli, S. & Montino, S. (2016). The written language of children with cochlear implant. *Hearing, Balance and Communication*, 14(3), 103-110. doi:10.1080/21695717.2016.1197619
- Bajarh, B. (2019). Teaching written english through interactive approach: an intervention for hearing impaired learners. *Language in India*, 19(9), 139-147.
- Bell, N., Angwin, A. J., Wilson, W. J. & Arnott, W. L. (2019). Spelling in children with cochlear implants: Evidence of underlying processing differences. *Journal of Deaf Studies and Deaf Education*, 24(2), 161-172. doi: 10.1093/deafed/eny035
- Crawford, L., Lloyd, S., & Knoth, K. (2008). Analysis of student revision on a state writing test. *Assessment for Effective Intervention*, 33(2), 108-119. doi:10.1177/1534508407311403
- Crosson, J. & Geers, A. (2001). Analysis of narrative ability in children with cochlear implants. *Ear and Hearing*, 22(5), 381-94. doi:10.1097/00003446-200110000-00003
- Çizmecici, H. & Çiprut, A. (2018). Evaluation of the reading and writing skills of children with cochlear implants. *The Journal of International Advanced Otology*, 14(3), 359-364. doi: 10.5152/iao.2018.4436
- Dostal, H. M. & Wolbers, K. A. (2014). Developing language and writing skills of deaf and hard of hearing students: A simultaneous approach. *Literacy Research and Instruction*, 53(3), 245-268. doi: 10.1080/19388071.2014.907382
- Dunn, M., Albagshi, A. & Aldawsari, F. (2022). Investigating writing instruction practices for students with deafness and hearing loss. *Language and Literacy/Langue et littérature*, 24(2), 153-173. doi:10.20360/langandlit29528
- Efe, A. & Karasu, H. P. (2017). Kaynaştırma eğitime devameden işitme engelli öğrencilerin yazdıkları öykülerin incelenmesi [Examining the stories written by hearing impaired students attending inclusive education]. *Ankara Üniversitesi Eğitim Bilimleri Fakültesi Özel Eğitim Dergisi*, 18(3), 329-354. doi:10.21565/ozelegitimdergisi.330878
- Faigley, L., & Witte, S. (1981). Analyzing revision. *College Composition and Communication*, 32(4), 400-414. doi:10.2307/356602
- Geers, A. E. & Hayes, H. (2011). Reading, writing, and phonological processing skills of adolescents with 10 or more years of cochlear implant experience. *Ear Hear*, 32(1), 49-59. doi: 10.1097/AUD.0b013e3181fa41fa
- Geers, A. E., Nicholas, J. G. & Moog, J. S. (2007). Estimating the influence of cochlear implantation on language development in children. *Audiological Medicine*, 5(4), 262- 273. doi:10.1080/16513860701659404
- Grenner, E., Weijer, J., Johansson, V. & Sahlén, B. (2022). Predictors of narrative text quality in students with hearing loss. *Logopedics Phoniatrics Vocology*, 47(3), 157-165. doi:10.1080/14015439.2021.1881613
- Karasu, H.P. (2014). İşitme yetersizliği olan öğrencilerin yazılı ürünleri gözden geçirme ve düzeltme evresinde duydukları ihtiyacın belirlenmesi [Examining the stories written by hearing impaired students attending inclusive education]. *Kuram ve Uygulamalarda Eğitim Bilimleri*, 14(3), 1089-1109. doi:10.12738/estp.2014.3.1728
- Kolb, K. H., Longest, K. C. & Jensen, M. J. (2013). Assessing the writing process: Do writing-intensive first-year seminars change how students write? *Teaching Sociology*, 41(1), 20-31. doi:10.1177/0092055X12448777
- Mayer, C. & Trezek, B. (2018). Literacy outcomes in deaf students with cochlear implants: Current state of the knowledge. *Journal of Deaf Studies and Deaf Education*, 23(1), 1-16. doi:10.1093/deafed/enx043

- Mayer, C., Watson, L., Archbold, S., Zheng, Y. & Mulla, I. (2016). Reading and writing skills of deaf pupils with cochlear implants. *Deafness & Education International*, 18(2), 71-86, doi: 10.1080/14643154.2016.1155346
- Milaham, R. S. (2020). Narrative story-telling in developing signed and written texts for students with hearing loss in bassa, plateau state, Nigerya. *Journal of Educational Research in Developing Areas*, 1(2) 88-99. doi:10.47434/JEREDA/1.2.2020.88
- Oliveira, K. L., Feitosa, A. L., Depolli, G. T. & Pedruzzi, C. M. (2020). Reading and writing performance in cochlear implant users: integrative review. *Literature Review*. 25, 1-8. doi:10.1590/2317-6431-2020-2298
- Quick, N., Harrison, M. & Erickson K. (2018). A multilinguistic analysis of spelling among children with cochlear implants. *The Journal of Deaf Studies and Deaf Education*, 24(1), 41-53. doi: 10.1093/deafed/eny029
- Straley, S. G., Werfel, K. L. & Hendricks, A. E. (2016). Spelling in written stories by school-age children with cochlear implants. *Deafness & Education International*, 18(2), 67-70. doi:10.1080/14643154.2016.1143168
- Wolbers, K. A. (2008). Using balanced and interactive writing instruction to improve the higher order and lower order writing skills of deaf students. *Journal of Deaf Studies and Deaf Education*, 13(2), 257-277. doi:10.1093/deafed/enm052
- Yasamsal, A., Ersoy, E. & Sennaroglu, G. (2013). Relationship between age of cochlear implantation with written language skills in children. *The Journal of International Advanced Otolaryngology*, 9(1), 38-45.
- Yin R. K. (2014). *Case Study Research Design and Methods* (5th ed.). Thousand Oaks: Sage Pbc.