



## THE EFFECT OF NOTE-TAKING STRATEGY ON LISTENING COMPREHENSION SKILL

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### Abstract

Comprehension of audio texts is quite challenging given the varieties of texts, speaker qualities, listener proficiencies and the features of spoken texts. One of the features of spoken texts is the retention of information. Taking notes has been suggested to overcome this challenge in the literature. A static-group pre-test/post-test study, one of the poor experimental research designs, was conducted on two existed high school groups to see the effect of a note-taking strategy on high school. One group was allocated to an experimental group and the other to the control group. The studies lasted for eight weeks. Mid-term exams are functioned as pre-tests. Final exams served as post-test exams. Descriptive and inferential statistics and content analysis showed that students' listening performance did not improve, as indicated by the insignificant differences between the groups. It was discussed that the reason behind this finding lay in the deficiency of knowledge and note-taking skills since students were observed to write the words as they were spoken, which did not help them solve the comprehension questions in the listening tests. Some educational and research suggestions were also presented based on the research findings.

**Keywords:** English language teaching, listening comprehension, cognitive strategies, note-taking skills, language skills

### Not Alma Stratejisinin Dinleme Becerisine Etkisi

### Öz

Sesli metinlerin anlaşılması, metin türleri, konuşmacı nitelikleri, dinleyici yeterlilikleri ve konuşulan metinlerin özellikleri göz önüne alındığında oldukça zordur. Sesli metinlerin özelliklerinden biri de bilgiyi muhafaza etmektir. Bu zorluğun üstesinden gelmek için not almanın faydalı olabileceği alan yazında önerilmiştir. Bir not alma stratejisinin lise öğrencileri üzerindeki etkisini görmek için iki bütünlük lise sınıfından yarı deneysel bir çalışma yapılmıştır. Bir sınıf deney grubuna, diğeri ise kontrol grubuna atanmıştır. Çalışmalar sekiz hafta sürmüştür. Ara sınavlar ön test, final sınavları ise son test olarak kullanılmıştır. Betimsel ve çıkarımsal istatistikler ve içerik analizi gruplar arasındaki anlamlı farkların olmadığını, not tutmanın öğrencilerin dinleme performanslarını geliştirmediğini ortaya koymuştur. Bu sonucun arkasındaki neden ise öğrencilerin konuşulan kelimeleri olduğu gibi yazdıkları ve not alma bilgisi ve becerilerinin eksikliklerinin bulunduğu bu da dinleme testlerindeki soruları çözmelerine yardımcı olmadığını göstermiştir. Araştırma bulgularına dayanarak bazı eğitim ve araştırma önerileri de sunulmuştur.

**Anahtar Kelimeler:** İngiliz dili eğitimi, dinleme becerisi, bilişsel stratejiler, not tutma becerileri, dil becerileri

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## Introduction

Listening comprehension in a foreign language plays a crucial role in language learning as it is essential to effective communication. The significance of listening skills in language acquisition cannot be disregarded since effective listening involves the simultaneous involvement of various cognitive processes, requiring individuals to decode, comprehend, and interpret spoken language. The intricacy lies in simultaneously navigating both the language intricacies and the subject matter of talk, leading to potential setbacks in listening comprehension. Students often encounter challenges in comprehending and retaining every word, especially during prolonged listening practices. As the duration of listening sessions increases, the complexity of developing and maintaining listening comprehension also intensifies. This difficulty in listening skill development creates a substantial gap in language learning, as students may hesitate to cultivate a skill they struggle to grasp fully. To address this gap, specific strategies were developed to enhance students' listening skills and boost their comprehension levels (Gökmen, 2022).

One such strategy that has proven effective in language learning is note-taking. Note-taking is a strategy used to enhance the retention of information and record it selectively in memory (Aydın, 2022). By cultivating proficiency in note-taking while listening, students can overcome the challenges of comprehending and retaining every word. Taking notes is not just a way to remember what was said; it is a way to actively engage with the material and digest and process it in real time. In a real-life situation, no one can keep all the content of a lecture or a text in memory without taking notes. They usually take notes so that they can remember the essential points of the lecture or the text later (Kılıçkaya & Çokal-Karadaş, 2009). The acquisition of practical note-taking skills is pivotal in aiding students' understanding and retention of information conveyed during listening exercises. For instance, while transcribing spoken content verbatim may be impractical, employing techniques like using keywords, mind-maps, and abbreviations in note-taking proves invaluable in deciphering and retaining the essence of the listened material. This practice allows them to revisit their notes and effectively capture critical points they may have initially missed, subsequently filling in any gaps in their comprehension. By actively engaging in the process of taking notes while listening, students equip themselves with a valuable tool for later reference. In essence, proficient note-taking serves as a personalised resource that enhances real-time understanding and is a strategic aid for reinforcing and solidifying the grasp of information over time. This study aims to make participants of this study active listeners in the language learning process by examining the relationship between note-taking strategy and listening comprehension.

### Literature Review

Note-taking is an essential strategy that offers encoding (i.e., the practice of getting information into our memory system through attention and effort), which shows learning via writing skills. Note-taking can be a helpful strategy for all language skills, including writing, reading, speaking, and listening. As a comprehension skill, listening provides people with the most extensive input during language acquisition and knowledge improvement (Hunsaker, 1990), and it also forms the basis of other language skills (Özbay, 2005). As it is estimated that people forget 80% of the content of an audio text as suggested by Ebbinghaus (1885) in “forgetting curve” theory, learners could take notes while listening to recall more (Özbay, 2005), as notes are necessary for recalling what has been heard or seen and can advance reflection afterwards (Nguyen, 2006). For this reason, note-taking is considered a crucial activity that enhances learning. Over the years, researchers have tried to explore whether note-taking helps students encode the information involved and whether notes are valuable materials for review (Ladas, 1980).

Some researchers support the idea that note-taking increases students’ achievement. In contrast, some say there is no significant difference in achievement between note-takers and non-note-takers. For instance, Kiewra and Frank (1988) conducted a comparative study on the performance of the students who used note-taking techniques and those who did not. He discovered that the students who took notes outperformed the non-note-taking students. Similarly, in an experiment (Di Vesta & Gray, 1972), subjects listened to three 5-minute parts under various note-taking, rehearsal, and testing conditions. Results indicated that using the study interval for review improved word retention and multiple-choice test scores. Rehearsal, testing, and note-taking all positively impacted the quantity of concepts retained.

Note-taking also offers benefits after listening. Notes become evident resources and data to be revisited while completing tasks (Siegel, 2022). Note-taking participants scored higher on multiple-choice tests than those who only listened. Since the learners cannot listen effectively when encountering different pronunciations, cultures, and grammatical structures while listening, the note-taking technique helps them complete the target activities correctly in subsequent activities. Hayati and Jalilifar (2009) conducted a study to explore the link between note-taking strategies and students’ listening comprehension. The research involved 60 participants in English Translation Department, who were divided into three groups: those who did not take notes, those who took notes without specific instruction, and those who were trained in the Cornell note-taking method. The findings indicated a significant relationship between the type of note-taking strategy used and the students’ ability to comprehend listening materials. It is also seen that note-taking helps learners not only in learning but also in developing writing skills (Boch & Piolat, 2005).

In a study carried out by Carrell, Dunkel, and Mollaun (2002), students expressed that they felt comfortable when they take notes during classes; moreover, they also noted that note-taking strategy helped them remember what they learned. In the another study, Aydın (2022) stated that the studies on note-taking strategy are limited to specific topics, research methods and similar samples even though the number of the studies on note-taking increases in Türkiye day-by-day. As we can understand from the aforementioned studies carried out to see the importance of note-taking during listening comprehension activities, instructors may emphasize the importance of note-taking skills in their classrooms. However, spoonfeeding must be avoided as suggested by some researchers who advocate that learners need to improve their note-taking strategies, which can be called “individualised note-taking strategies”, that is, using or exploring their way of note-taking strategy without any pressure to one particular way of note-taking. Dembo (1994; as cited in Seif, 2001) finds notes useful if the reader’s explanation and interpretations accompany them. He called these types of notes note-making, and he imported taking brief notes in the learner’s own words so that the main points can be included, organised and meaningful to the learner. In the same vein, Slotte and Lonka (1999) found that taking high-quality notes is relevant to success in tasks which call for broad text comprehension. Therefore, it is not wrong to claim that note-taking is an effective strategy for comprehension and writing skills.

For individualised note-taking strategies, learners make use of various techniques. These techniques can include using keywords or simple and short sentences, mind mapping, concept mapping, other self-generated materials, etc. Therefore, learners should use note-taking strategies to save time when listening because organized notes as condensed study aids can help students study practically and reduce the time needed for reviewing entire texts or lectures (Kiewra, 1985). As for linguistic techniques, note-taking is a strategy that can be used to use abbreviations, illustrations, symbols and other techniques to capture the essence of the subject that s/he listens to or reads (Güneş, 2007; Friedman, 2014). Similarly, the study by Hsieh (2006) examined the relationship between college students’ note contents and their listening comprehension of English courses and their retention. Results indicated that many students were aware of note-taking tips such as using key terms, symbols, abbreviations, etc. However, it is also suggested that learners should be taught these techniques to get the best results from a note-taking strategy before using it. According to Bakunas and Holley (2001), note-taking skills should be taught to students in the same manner that they are taught writing or computer skills. Since note-taking is a crucial skill, many educators (Bakunas & Holley, 2001; Eidson, 1984; Kiewra, 1987; Meyer, 2002; Ornstein, 1994; Spires & Stone, 1989) believe that it should be explicitly taught in school. According to Ornstein (1994, cited in Meyer, 2002), note-taking should be part of the curriculum. İpek (2018) conducted a study to assess the perceptions of 61 first-year students in an English Language Teaching (ELT) program regarding their note-taking and listening

skills. The findings indicated that most students improved their listening task performance after being taught specific note-taking strategies during the study. Additionally, the students progressed in sub-skills such as pronunciation and became more aware of different accents not initially included in the course syllabus at the study's outset. In this case, the note-taking strategy benefits listening and improves other skills.

On the other hand, some researchers emphasise that note-taking does not significantly affect learners' listening comprehension and academic achievement. They state that note-taking does not positively affect achievement and comprehension. Memory effect, reviewing the notes or recalling them provides the achievement rather than a note-taking strategy. Hale and Courtney (1994, p. 29) stated that the students who took notes in TOEFL on lectures or mini-talks did not perform better than the others. Students remembered the text's main points and answered correctly without needing high-level discourse processing. Similarly, Bohay et al. (2011) found that taking notes improved the students' performance for verbatim information and provided deeper understanding at the situation level; however, no advantages were found at the text-based level. These studies show that note-taking does not always contribute to students' achievement.

Ward and Tatsukawa (2003) stated that note-taking strategy has two functions. First, the notes taken by learners are helpful for reviewing. Second, the process of note-taking itself is helpful for learners to learn the material. As a result, it provides both language and cognitive development for learners. For this reason, the theory underlying this study is cognitivism. It emphasises the innate capacity to learn a new language. Cognitivism advocates that language learners are creative and can connect relationships between what they know (i.e., it stands for listening in our context) and what they need to do. Language learners are the active participants of the learning. This theory also underlines the importance of making knowledge meaningful, organising the new information according to their needs, and then relating it with their existing/background knowledge in their mind. From this perspective, the relationship between listening comprehension and note-taking strategy can be studied best using the cognitivist theory. The aim is to help language learners pay attention to focusing on listening comprehension and what they can get best from listening comprehension.

This study's primary objective is to assess and improve learners' listening comprehension skills by implementing note-taking strategies, enabling learners to retain better information acquired through listening. Additionally, this study is conducted to contribute to the studies relevant to the note-taking strategy with a different student level, implementation and context. The investigation in this study delves into the possible impacts of note-taking skills on enhancing listening abilities. Therefore, two research questions will be answered in this study:

- 1) Is there any difference between non-note-taking and individualised note-taking regarding the achievement of listening comprehension activity?

- 2) How do the participants take notes? To what extent does the note-taking help them enhance their listening comprehension?

### **Methodology**

This study was mainly designed as a static-group pre-test/post-test study, one of the poor experimental designs (Fraenkel, Wallen, & Hyun, 2012), as the participants were not assigned randomly; instead, they were already existed as intact groups (Creswell, 2009). The intact groups were assigned as experimental and control groups. The experimental group was prompted to take notes while listening. The control group did not take notes; instead, they listened to audio texts and did the following exercises. Students' notes were also exposed to content analysis to observe the nature of notes more in-depth.

### **The Study Context**

The study group consisted of 38 participants, who were 10<sup>th</sup>-grade students in an Anatolian High School in Turkey. The participants were between 13-15 years old. Out of 38 participants, 26 were females and 12 were males. 38 participants were already in two different intact groups; the first group of 19 participants was randomly determined to be the experimental (intervention) group, and the second group of 19 participants was chosen to be the control group.

### **The Intervention**

The intervention started with observing students' low scores on the listening test. Based on the perusal of the literature review, one of the strategies to improve listening comprehension was found to be note-taking, which was noticed to be lacking in language learners while listening in the study context. Therefore, note-taking was implemented in one group to see its effectiveness in listening comprehension. The experimental group were instructed about the transient nature of listening, which could be forgotten in the course of listening, and lectured about the possible benefits of note-taking while listening as a cognitive strategy to compensate for the fleeting characteristics of listening skills. To this end, after the pre-test, the experimental group was suggested and requested to take notes on a sheet of paper about the most important details, including names, numbers, ideas, or words. They were allowed to take notes according to their preferred styles, either with some abbreviations or full sentences, while listening to the aural text; that is, no specific note-taking model was adopted. The listening texts were selected from the OGM Material Website (i.e., a website with various language teaching materials published by The Ministry of National Education of Türkiye). The study lasted eight weeks, and the instructor applied one listening activity per week. However, the control group was not allowed to take any notes. The aim was to test whether the note-taking strategy improved students' listening comprehension skills.

**Data Collection and Analysis Procedures**

The mid-term exams consisting of comprehension questions of a listening text served as pre-tests given to both groups. One experimental group of learners was instructed to take notes of the listening texts in their styles. The other control group did not take notes while listening. Both groups listened to the listening texts once. The students were then asked to use their notes to solve the questions in listening comprehension tests. While the students who took notes solved the questions with the help of these notes, the other group tried to solve the questions only based on what they had heard and remembered. After answering questions, the notes were collected weekly to explore their note-taking skills and use of abbreviations, symbols, or letters (if any). A second listening session allowed the students to check their questions. In the final step of the study, the final exam as a post-test was given to both groups again. After the post-test, the results and findings were analysed and compared.

Descriptive and inferential statistics were applied to analyse the pre-test and post-test data. SPSS 20 software was used for the data analysis. Given the small sample size and the need for fewer generalised assumptions about the population (Fraenkel et al., 2012), a non-parametric test was deemed appropriate for this study. Consequently, the Wilcoxon Signed-Rank test was employed to determine the significance of the pre-test and post-test scores in both experimental and control groups. Mann-Whitney U test was computed for differences in post-tests between experimental and control groups in addressing the first research question. The content of the students’ notes in the experimental group was analysed within the framework of inductive content analysis.

**Findings**

The first research question examined how note-taking during listening could enhance listening comprehension. Descriptive statistics (such as mean scores and standard deviations) and inferential statistics (to assess the significance of the results) were utilised to address this. Non-parametric Wilcoxon Signed-Rank test was performed to assess the significance of the pre-test and post-tests for experimental and control groups. Mann-Whitney U test was computed to see the difference in post-tests between experimental and control groups.

**Table 1**

*The Wilcoxon Signed Ranks Test Between the Pre-Test and Post-Test of the Experimental Group*

		N	Mean Rank	Sum of Ranks	Sig. (2-tailed)
Post-test/Pre-test	Negative Ranks	7 <sup>a</sup>	7.00	49.00	.824
	Positive Ranks	7 <sup>b</sup>	8.00	56.00	
	Ties	5 <sup>c</sup>			
	Total	19			

Table 1 shows the results of the Wilcoxon Signed Ranks Test, which does not indicate a statistically significant difference between pre-test and post-test exam scores ( $p=.824$ ,  $p<.001$ ). This shows that listeners' note-taking practice did not help improve listening comprehension. While half of the listeners ( $7^b$ ) raised their listening scores, the other half ( $7^a$ ) had a decrease in their listening scores in the post-test, and five listeners scored the same ( $5^c$ ) in the pre-test and post-test exams.

**Table 2**

*The Wilcoxon Signed Ranks Test Between the Pre-Test and Post-Test of the Control Group*

	N	Mean Rank	Sum of Ranks	Sig. (2-tailed)
Post-test/Pre-test	Negative Ranks	8 <sup>a</sup>	8.69	.481
	Positive Ranks	10 <sup>b</sup>	10.15	
	Ties	1 <sup>c</sup>		
	Total	19		

The Wilcoxon test was again computed for pre-test and post-test scores in the control group to test the findings above. Results evinced in Table 2 that no statistical difference was found between the pre-test and post-test ( $p=.481$ ,  $p<.001$ ). However, contrary to the scores in the experimental group, the control group surprisingly and relatively performed better listening comprehension by having more listeners increased their listening scores in the post-test ( $10^b$ ), though again not statistically significant.

**Table 3**

*The Mann-Whitney U Test Between the Post-Tests of Experimental and Control Group*

	Mean Rank	Sum of Ranks	Sig. (2-tailed)
Post-tests	Experimental group	17.45	.244
	Control group	21.55	
	Total		

Mann-Whitney U test was recomputed to see whether experimental group scored better than control group. The figure of significant difference ( $p=.244$ ,  $p<.001$ ) showed no difference between the post-tests of experimental and control groups. On the contrary, though not significant, control group scored better ( $N=21.55$ ) than experimental group ( $17.45$ ) which could be explained with the learners' low proficiency to do both listening and note-taking simultaneously.

To answer the second research question as regards the content analysis of the notes, when the notes taken by the students were observed, it was seen that most of them took notes on a word-by-word basis. Students were taking notes while listening and specifically scribed down what they heard. In other words, they did not consider that English is not written like it is read. While taking notes, the students only noted what they heard without paying attention to grammar or spelling rules. The notes taken by students are related to the answers to some questions. Students were given time



to write their thoughts at the end of the listening. Most students wrote that it was difficult to both listen and take notes and that they could not keep up with taking notes due to the speed of speaking.

### **Discussion**

In summary, even though note-taking generally has a significant role in teaching language skills, including listening, no positive effect was identified on listening comprehension among our participants, which contradicts the findings of Kiewra and Frank (1988), Di Vesta and Gray (1972), Hayati and Jalilifar (2009). Both İpek (2018) and Kılıçkaya and Çokal-Karadaş (2009) underscore the importance of effective note-taking strategies in improving listening comprehension, which contrasts with the current study's findings. When the p values were analysed, there was no significant difference between pre-and post-tests, confirming the findings of Dunkel (1989) and Hale and Courtney (1994, p. 29). Teng (2011) found that especially summarization and structured note formats demonstrated higher comprehension scores. In contrast, the current study showed that many participants employed word-for-word note-taking, which did not significantly improve listening comprehension. This indicates a lack of effective strategy use among students in the current study, aligning with Teng's findings that ineffective note-taking can hinder comprehension. When the notes taken by the students were examined, it was seen that some wrote in the way they heard in complete sentences, while others only wrote keywords. In addition, since students tried to write as they heard while taking notes, syntax rules were not very visible in the notes they took. The fact that the sentences the students used while taking notes were not wholly correct may also have caused them not to benefit from the notes they took while solving the questions.

The findings were interpreted that it could have been challenging for the students to try to perform more than one skill while taking notes. Some remarks requested at the end of the intervention pointed out that the listening passages progressed too quickly and the speakers spoke too quickly; therefore, they could not capture the information they wanted (Renandya & Farrell, 2011). Students also stated that it would be better if they listened to the listening text once more. However, the primary purpose of having them listen to the listening text once is to observe the students' note-taking skills. If students listened more than once, they could change their notes and answers to the questions, which could overshadow our purpose of observation. Students have not received any training on note-taking skills before, so this method, which they encountered for the first time, might have been challenging for the students. Since the note-taking technique in listening skills was a technique that the students were not accustomed to, no full feedback could be received from the students. It was observed that the students had deficiencies in how they should take notes. The students' notes may have been insufficient in helping them solve the questions in the ongoing process. Therefore, as suggested by Bakunas and Holley (2001), note-taking skills could be provided to students in some

courses. The current study's lack of significant improvement in comprehension scores suggests that encouraging note-taking is insufficient without teaching effective methods. Note-taking methods can improve students' listening and comprehension skills, but this effect depends on many factors as proven by Gökmen et al. (2024). In particular, an effective note-taking process plays an important role in improving students' active listening and knowledge structuring skills. These findings are consistent with the observations in our current study, as some students had difficulty using an effective strategy when taking notes, which may affect their listening comprehension skills. Further research is required to better understand the effects of note-taking techniques on listening skills. Although the current findings demonstrate the potential for note-taking to improve listening skills, a more comprehensive evaluation with pre- and post-tests administered in different contexts and at different periods should be conducted to determine the extent and validity of this effect. In this way, the effects of note-taking techniques on listening skills can be more clearly demonstrated, and the situations in which they yield the best results can be determined. This will clarify the extent to which note-taking is an effective method for improving listening skills.

### **Conclusion**

Note-taking while listening to a recording or a lecture is deemed to be an essential strategy in the literature. Despite the inconsistent results regarding to benefits of the notes, note-taking might ease recalling the content of the text and the needed information to complete a task. In this study, the participants were allowed to take notes during the listening and did not have to remember all the text details while answering the comprehension questions. For this reason, note-taking does not force students to recall all the details; instead, it helps them focus on the questions with the help of the notes they take. As this study and related studies showed, note-taking does not mean bringing success independently though it could make this process easier. Additionally, when students focus on taking notes while listening, they may not concentrate on the content of the recording since their primary focus is on taking notes, not the content of the recording. This study on students' note-taking skills revealed that students lack knowledge about note-taking and do not know how to take notes, how to interpret these notes, and how to benefit from these questions when solving the comprehension questions. Students' failure to use this technique effectively may have affected the progress of the study and the results obtained. The syntax errors made by the students while taking notes clearly showed that they wrote down exactly what they heard. This study was conducted on Turkish students, and the differences between Turkish and English may have caused students to have difficulty taking notes and not fully benefit from this skill. The findings of the study highlight that language differences between students' first language (L1) and second language (L2) can hinder their note-taking skills. This suggests that language proficiency plays a critical role in students' ability to utilize note-taking skills

and raises concerns about the applicability of this strategy in multilingual contexts. As a result, the complete effect of note-taking techniques on listening skills was not seen probably due to the nature of the poor experimental research design which does not control the variables that could pose threats for the internal validity (Fraenkel, Wallen, & Hyun, 2012). In conclusion, while existing research suggests that effective note-taking can improve listening comprehension, the current study highlights the challenges students face when implementing these strategies. Based on the findings of studies such as Gökmen et al. (2024), Kiewra (1988), and Teng (2011), it appears that both instructional strategies and further experimental research are critical to maximizing the benefits of note-taking in educational settings. Understanding the relationship between note-taking techniques and listening skills will help educators guide students more effectively.

To obtain further data and results about the effectiveness of note-taking on listening comprehension, it would be better to conduct more studies on this research topic by adding the abovementioned variables. At this point, we have some recommendations for future studies. The lack of effective training among students in note-taking techniques suggests that simply allowing them to take notes is not enough. Without appropriate training in effective note-taking and interpretation, students may have difficulty using this strategy to enhance understanding. Students should be given more comprehensive training on note-taking skills. This training should provide information on note-taking strategies, interpreting notes, and responding to questions more effectively. In order to better evaluate the effects of note-taking techniques, research should be conducted in various contexts and with different types of listening materials. This can help us understand how note-taking strategies work in different situations. Support should be provided to students to develop language skills to address the difficulties arising from the language differences between L1 and L2. The effects of linguistic differences on note-taking skills should be investigated, and appropriate supporting strategies should be developed. Long-term and repeated tests should be applied to evaluate the long-term effects of note-taking techniques on listening skills. This can reveal the permanent effects and impact of note-taking strategies more clearly. Both qualitative and quantitative data collection methods should be used. This will allow for a more comprehensive analysis of students' note-taking process and effects. While the current findings suggest that note-taking has the potential to improve listening skills, a more comprehensive evaluation is needed. Future studies should consider using pre- and post-tests across contexts and periods to assess the true impact of different note-taking techniques. Such an approach will provide clearer results on which strategies are most effective in improving listening skills and under what conditions they yield the best results. At this point, it will be clear whether students should apply the strategy or not. These findings underscore the need for a more nuanced understanding of note-taking in educational contexts and highlight areas for future research and instructional improvements.

### Research and Publication Ethics

This study complied with all the rules specified in the 'Directive on Scientific Research and Publication Ethics of Higher Education Institutions'. None of the actions specified under the second part of the Directive, 'Actions Contrary to Scientific Research and Publication Ethics', have been carried out. (Mandatory declaration).

### Ethics committee permission information

Name of the ethics review board: Siirt University  
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### Contribution Rate of Authors

In this study, the contribution rates of the authors were realised as 1st author 40%, 2nd author 30%, 3rd author 30%. (Mandatory declaration).

### Conflict of Interest

There is no situation that may constitute a conflict of interest. (Mandatory declaration)

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