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Exploring the Pedagogical Potential of Earplug in Flute Training: A Qualitative Analysis

Ümit KOÇ[1], Reha SARIKAYA[2], Ü. Bircan BİLGİN[3], Nihat KALKANDELEN[4]

Abstract

This qualitative research was conducted with the aim of revealing the usability of earplugs in relation to flute performance techniques. The participants of the sudy, who were selected using purposive sampling method, were composed of ten voluntary students enrolled in a state university offering professional flute training. Data were collected through in-depth face-to-face interviews. The interviews were audio recorded, transcribed verbatim, and analyzed using descriptive analysis. In the data analsis stage, the researchers generated and interpreted codes, categories, and themes, as well. The study was structured around three sub-problems. In the dimension of posture and hand position issues such as slam-and-squeeze and key noise emerged. Secondly, regarding breathing techniques, themes included breath control, intonation, and silent inhalation. Finally, themes such as tongue control and synchronization were identified in the dimension of articulation techniques. The results have revealed that earplugs can be utilized as effective pedagogical tools in flute teaching even if performers' efficiency may vary due to their demographic characteristics or some essential personalized approaches.

Keywords: *Earplug, Flute Training, Finger Technique, Articulation and Tonguing, Breath Control.*

Introduction

Instrumental training is one of the primary goals for individuals interested in music and actively engaged in this field (Kang, 2025). This skill, which involves a long and demanding developmental process, represents the performance and execution dimension of music, making it both impressive and complex in this era of education (Hargreaves et al., 2003, p.149-151). The primary mission of instrumental education is to equip individuals with this skill.

According to Schleuter (1997), instrumental education is a systematic process to acquire the competencies necessary to play an instrument (as cited in Özmenteş, 2005, p. 93). By its nature, this process requires continuity and encompasses lifelong development. The successful continuation of this process depends on a range of internal and external factors, such as the individual's social and physical environment, time management, practice habits, applied methods, attitudes, and motivational strategies (McPherson, Davidson & Evans, 2016, pp. 409–411; Shaheh, 2024, p.1761). However, the technical skills, expressive capacity, and musicality required for playing an instrument are considered to be the result of intensive practice and a combination of innate and acquired abilities. Therefore, the skills gained through instrumental

[1] Bartın University, Faculty of Education, Department of Fine Arts, 74110 Kutlubey Yazıcılar, Bartın, ORCID: 0000-0002-8205-2159.
[2] Bartın University, Faculty of Education, Department of Fine Arts, 74110 Kutlubey Yazıcılar, Bartın, ORCID: 0000-0002-8088-5173
[3] Karabuk University, Faculty of Fine Arts, Department of Music, 78600 Safranbolu, Karabük ORCID: 0000-0001-9415-8922.
[4] Şırnak University, Faculty of Fine Arts, Department of Music, 73002 Merkez, Şırnak, ORCID: 0000-0003-0345-2531.

education are regarded as high-level competencies, and the learner generally expects a certain degree of musical aptitude.

The flute, classified within the woodwind family, consists of three interlocking parts: the head joint, body, and foot joint. Like all wind instruments, sound in the flute is produced by transforming air into vibration through a hole in the instrument's tube (Atak-Yayla, 2000, p. 4). The flute has three tonal registers—low, middle, and high—and a sound range of approximately three octaves (Gençel, 2005, p. 6; Atak-Yayla, 2000, p. 5). The modern flute can perform nearly all musical passages thanks to its technical capabilities. Chromatic and diatonic scales, arpeggios, and challenging passages can be performed at any desired speed, either legato or articulated, making the flute one of the most agile and flexible instruments among wind instruments (Gençel, 2005, p. 6; Atak-Yayla, 2000, p. 6).

In noisy work environments, individuals often use personal hearing protection devices—such as earplugs—that are directly inserted into the ears to protect their hearing (Ataş, 2004, p. 83). These protectors are thought to have physiological benefits and positive effects on psychological well-being. It is suggested that earplugs can help prevent hearing loss, emotional disorders such as anger, anxiety, fear, and tension, as well as cardiovascular issues such as elevated blood pressure and circulation problems. They may also reduce physical symptoms like earaches, headaches, and cognitive issues, including sleep disturbances, reduced concentration, and diminished work efficiency (Ataş, 2004, p. 83; Yeşiltepe & Karadağ, 2019, p. 16).

In the context of musical performance, especially among wind and percussion instrumentalists, the use of standard-type earplugs is observed to be common. The primary reason for this is the high decibel levels produced by various instruments in polyphonic orchestras, particularly wind and percussion instruments, which can lead to long-term hearing loss in musicians. Therefore, earplugs are widely used among performance-focused musicians.

A review of existing studies in music indicates that earplugs are primarily examined in the context of their preventive function against hearing loss in musicians. However, their potential as a pedagogical tool—particularly in developing technical awareness—has not been sufficiently explored.

Therefore, the study sought answer to the main research question of *"To what extent can earplugs usable in terms of flute techniques?"* Based on this, the sub-research questions were formulated as in the following:

- What is the effect of earplugs on posture and hand position techniques in flute performance?
- What is the effect of earplugs on breathing techniques in flute performance?
- What is the effect of earplugs on articulation techniques in flute performance?

Method

Research Design and Study Group

This research is a qualitative study conducted to explore the usability of earplugs in terms of flute techniques. It was designed using a *basic qualitative research* approach. According to Merriam (2015), basic qualitative research seeks to understand how individuals interpret their lives and construct meaning from their experiences.

To determine the study group, the *purposive sampling* method—widely used in qualitative studies—was employed. According to Yıldırım and Şimşek (2018), purposive sampling enables in-depth exploration of individuals who are considered rich in information and is often an effective strategy for explaining specific phenomena or cases.

Accordingly, the study group consisted of ten voluntary participants enrolled in a higher education institution offering professional flute instruction. In the literature, it is noted that the sample size in qualitative studies is often determined by the saturation point—when no new information is being obtained—and that a sample of 5 to 25 participants is generally considered sufficient (Başkale, 2016, pp. 23–28).

In addition, the *convenience sampling* technique, which provides speed and practicality to research, was also used due to accessibility constraints. This technique is especially preferred in cases where the researcher may have limited access to other sampling methods (Yıldırım & Şimşek, 2018, p. 123).

Participants	*Educational Level*	*Type of High School Graduated*	*Instrument Experience*	*Interview Duration*	*Date of Interview*	*Performance Level*
Flutist 1	Bachelor's	Fine Arts High School	8 years	10:01	15.03.2025	Intermediate
Flutist 2	Bachelor's	Fine Arts High School	8 years	07:55	15.03.2025	Intermediate
Flutist 3	Bachelor's	Regular High School	4 years	09:42	15.03.2025	Intermediate
Flutist 4	Bachelor's	Fine Arts High School	8 years	11:55	15.03.2025	Intermediate
Flutist 5	Bachelor's	Fine Arts High School	8 years	15:53	15.03.2025	Advanced
Flutist 6	Bachelor's	Regular High School	2 years	12:00	15.03.2025	Beginner
Flutist 7	Bachelor's	Fine Arts High School	9 years	10:01	16.03.2025	Intermediate
Flutist 8	Master’s Degree	Fine Arts High School	13 years	09:55	16.03.2025	Advanced

Flutist 9	Bachelor's	Fine Arts High School	8 years	09:30	16.03.2025	Beginner
Flutist 10	Bachelor's	Regular High School	3 years	09:50	16.03.2025	Beginner

Table 1. Demographic Characteristics of the Participants

Data Collection Process and Analysis

In this study, data were collected through in-depth, face-to-face interviews. This technique relies on verbal interaction between the researcher and the participant (Uslu & Demir, 2022, p. 290).

Prior to the interviews, participants were informed about the study's objectives and were provided with earplugs. Each participant conducted their regular daily flute practice for approximately 60 minutes while wearing the earplugs, followed by an additional 10 minutes of performance after removing them. At the end of this 70-minute process, participants were invited for one-on-one interviews to share their experiences.

The data collection process involved conducting unstructured, open-ended interviews, which were recorded and transcribed verbatim (Creswell, 2021). Unstructured interviews do not rely on predetermined questions, allowing for flexible and in-depth data collection (Dömbekci & Erişen, 2022, p. 145). However, this flexibility can also create challenges in categorizing and analyzing the data. Therefore, researchers conducting such interviews should possess extensive knowledge of the subject and strong interviewing skills (Yıldırım & Şimşek, 2018, p. 118).

All interviews were audio- and video-recorded with the participants' consent. This practice aimed to prevent data loss and enhance the study's reliability and validity.

For data analysis, the audio recordings were transcribed and analyzed using the descriptive analysis method. This approach involves summarizing and interpreting the data based on pre-identified themes while also considering emergent themes that arise during the research process. Descriptive analysis aims to present the findings in a structured, meaningful, and interpretable manner for the reader. Therefore, direct quotations are frequently included to effectively represent the participants' perspectives (Yıldırım & Şimşek, 2018).

To ensure the study's reliability, the categories, themes, and interpretations derived from the data analysis were reviewed and evaluated with input from three field experts.

Validity and Reliability

The researcher meticulously organized the data collected for this study and clearly linked to relevant themes. Interpretations based on these themes were presented with precision in the findings section. To uphold ethical standards during data analysis and to ensure participant confidentiality, each individual was assigned a unique code. For the sake of anonymity, participants were referred to as "Flutist 1," "Flutist 2," and so forth during the interview process. Additionally, select statements from participants were included as direct quotations in the findings, discussion, and conclusion sections to reinforce our conclusions.

To enhance both the validity and reliability of the study, strategies such as peer debriefing, expert review, and rich descriptions were effectively employed. Expert and peer feedback was actively sought to evaluate the consistency and appropriateness of the codes, categories, and themes that

emerged from the data analysis. Furthermore, the research process was thoroughly articulated, and participants' direct statements were prominently featured in the findings section to substantiate the credibility and authenticity of the results.

Findings

The study, which aimed to reveal the effects of earplugs in terms of concentration, was examined under three sub-research questions. The codes, categories, and themes obtained are presented below, respectively, in line with each sub-research question.

What is the effect of earplugs on posture and hand position techniques in flute performance?

In this research, no significant awareness or improvements related to posture were observed. However, themes such as mechanical noise and key striking—factors that indirectly influence posture and hand position—revealed that participants developed a heightened awareness of certain hand position-related issues, with minor improvements noted in this area. The themes derived from the data are presented in Table 2, followed by comprehensive explanations and discussions in the results section.

Themes	**f**	**Participants**
"Mechanism Noises"	5	F2, F5, F8, F9, F10 F2: "I focused on the music with the earplugs on, but when I took them off, I noticed the mechanism sounds a lot. I also noticed that my fingers were moving unnecessarily." F3: "The sound of the mechanism was heard very clearly. There was a constant ticking sound." F:5 " When I had the earplugs on, it was like someone was humming inside me. When I took them off, the flute sound was like it was enchanted. It was the first time I heard the mechanism sounds so clearly." F8: "I heard a lot of mechanism noises when I was with the earplugs." F9: " I heard a lot of mechanism noises. I realized I was hitting the keys too hard and started hitting them softer."
"Hitting the keys while playing"	6	F2, F3, F5, F6, F9, F10 F2: "I was actually hitting too much; I shouldn't hit the keys that much. I move my hand too much during the trills; I hit the keys and move them too much." F5: "I heard the keystrokes very clearly. I realized how hard my fingers were hitting and tried to reduce it." F6: "I could hear the keystrokes normally, but they were even more annoying when the earplugs were on."

		F10: "When I first put the earplugs on and blew, I heard a clicking sound. I realized I was pressing too hard, and I reduced the pressure."

Table 2. Participant Opinions on the Effects of Using Earplugs in Terms of Posture and Hand Position Techniques

As seen in *Table 2*, the findings are grouped under two main themes. Under the theme of "mechanism noises", the views of the participants who stated that they heard the sounds of the mechanism more clearly when the earplugs were on and that they noticed these sounds for the first time were included. The participants in this theme stated that they were not directly aware of a playing error; rather, they were aware of an existing mechanical noise.

Scope of the second theme, which is "hitting the keys while playing". The participants stated that they realized that their hitting the instrument was too hard or uncomfortable and that they felt the need to improve their posture and holding techniques. It was also observed that some participants analyzed the mechanical noises they noticed in the first theme and made behavioral corrections in the second theme.

In this context, participants coded as F2, F5, F8, F9, and F10 were found in the theme of mechanism noises; participants coded as F2, F3, F5, F6, F,9 and F10 were found in the theme of hitting the keys while playing. Considering that a total of seven participants were gathered under this category, it can be said that the study with earplugs made a significant contribution to the posture and hand position dimension.

What is the effect of earplugs in terms of breathing techniques in flute playing?

As a result of the analysis conducted in the research in terms of breathing techniques, findings were obtained in line with the themes of air control, intonation and silent breathing. These themes are presented in *Table 3* with direct quotes from the participant statements in accordance with the principle of rich description. The themes obtained were interpreted below the table and various suggestions were developed by discussing them in the results section.

Themes	**f**	**Participants**
"Air Control"	9	F1, F2, F3, F4, F5, F6, F7, F9, F10 F1: "I could feel the airflow with earplugs. I'm not usually that aware." F2: " "I noticed the depth of my breathing when I was playing with earplugs. Normally, I was breathing quickly and shallowly. I realized that I needed to take deep breaths when I was playing with earplugs. I changed where I was breathing. I used to breathe too much in unnecessary places." F3: "I realized that my breath was not enough in the third-octave sounds. I paid more attention to my breath control with earplugs. I realized that I used my breath more economically in long passages. I was able to play passages that used to tire me more easily.."

“Intonation”	6	F:4 “When I was blowing with earplugs, the sounds were more 'tonal', but I felt like I wasn't breathing enough. Then I focused on breathing exercises. I was very tired after working for an hour. It meant I wasn't using my breath efficiently." F5: “My breathing control was better. I could use my breath for longer periods of time. It was as if someone was humming inside me. I felt like my breath and the sound of the flute were integrated." F6: “I started to breathe more controlled. I realized that I could hold my breath until the end of the measure." F7: " I realized I was leaking air through my nose! It was especially noticeable on the high notes." F9: "I rediscovered where I breathe. I realized I was taking some unnecessary breaths. I felt like I was using my diaphragm more. It was like my lungs expanded." F10: “I felt my throat tighten. Since I could hear less sound with earplugs, I felt my breath inside me and started using my diaphragm more deeply."
“Silent Breathing”	4	F1, F2, F3, F4, F8, F9 F1: " I was blowing out too loudly to be able to hear my own voice. I became high-pitched without realizing it. I had to learn to regulate my breathing." F2: "I wasn't very aware of it with earplugs. However, after I took them out, the sounds were low-pitched. I looked at the tuner while working with earplugs, the sounds were not holding up. I got better results after I took them out." F3: "I had trouble with my low notes (do, re, mi). I heard them better with earplugs and corrected them." F4: "I look at the tuner, but the sounds are never correct. When I took the earplugs out, everything was fine. However, my tone was better with the earplugs. I don't know what to trust!" F8: "I lost my breathing tones. My breath control at the beginnings and ends of the voice became weaker." F9: "I heard the melody clearly with the earplugs in, but it didn't match the tuner. I was confused." F4, F6, F7, F8 F4: "My breathing sounds were very disturbing when I was blowing through the earplugs. I need to learn to breathe more quietly." F6: "Hearing the airy sound of my breath with the earplugs on taught me to breathe more quietly. When I took the earplugs

		off, the sound of my breathing became even louder. It meant that I was breathing this loudly normally." F7: "The sound of my breathing was very disturbing. From now on, I will learn to breathe quietly by opening my mouth wider." F8: "With the earplugs on, I could feel my breath, but I couldn't hear it. It was a strange experience."

Table 3. Participant Opinions on the Effects of Using Earplugs in Terms of Breathing Techniques

When the participants' opinions on the use of earplugs in terms of breathing techniques are examined in *Table 3*, it is seen that nine of the participants developed an awareness within the scope of the air control theme. When these awarenesses were divided into subcategories, it was determined that positive developments were experienced in dimensions such as airflow, deep breathing, effective use of air, efficient use of air, and improvements in tone.

Similarly, when the theme of *silent breathing* is considered, it was observed that the discomfort experienced while wearing earplugs became more pronounced after they were removed. This can be considered a positive development as it created an awareness among the participants to develop the habit of silent breathing.

On the other hand, negative findings are noteworthy within the scope of intonation. Participants stated that they experienced high pitch when they tended to use more air due to the lack of sound; and low pitch at the end of the sound due to insufficient sound. This situation shows that the change in sound perception caused by earplugs can negatively affect intonation control.

As a result, it can be said that earplugs provide positive effects in terms of *air control* and *silent breathing;* however, they may cause some negativities in terms of *intonation.*

What is the effect of earplugs in terms of tongue techniques in flute playing?

As a result of the analysis conducted in the study in terms of tongue techniques, findings were obtained within the scope of the themes of *tongue control* and *synchronization*. These themes are presented in *Table 4* with direct quotes from the participants' statements in accordance with the principle of rich description. The results section discusses the findings obtained, and various suggestions are included.

Themes	**f**	**Participants**
"Tongue Control"	9	F1, F3, F4, F5, F6, F7, F9, F10 F1: "My articulations were much clearer. I could hear every tick, tick, tick. I can't hear it when I'm playing normally!" F3: " When I tapped my tongue, it sounded like a rattling in my head. I felt uncomfortable, so I tapped it softer. Because I was uncomfortable with the sound of my tongue, I unconsciously tapped it softly. That was good!" F:4 "The tongue sounds were 'tock tock tock'. Like a bass drum! I tried to fix it, but it was hard." F5: " When I took the earplugs off, I saw how hard my

"Synchronization"	7	tongues were. I never noticed it with the earplugs. I was more comfortable playing with the earplugs on, but when I took them off, I saw how hard my tongues were." F6: " "I could tell with the earplugs whether I had hit my tongue or not. Normally I forget!" F7: " I felt like my tongue was tightened. I couldn't relax it with the earplugs on, so I softened it after taking them off. Also, the noise of the mechanism and the sound of the tongue hitting each other made it even more uncomfortable." F9: "When I heard my tongues with the earplugs, I said, 'I should use this more neatly.' I paid attention." F10: "I heard the key sounds a lot with earplugs, I realized I was pressing hard. I tried to reduce it." F1, F2, F4, F6, F8, F9, F10 F1: " I was practicing with a metronome, so I was coming in sync. Normally it's not very synced, my tongue is usually slurred." F2: " I realized how irregular my articulations were. The clicking sounds were very noticeable." F4: " My fingers were moving, but my tonguing was late. It was like the tongue is not mine! When I put the earplugs on, my tongue clicked like a machine! It was like there was a metronome in my mouth." F6: " "I realized how irregular my articulations were. I started to work with more control." F8: "I could hear the key sounds, but I couldn't hear the articulations clearly. I felt the tongue sounds a lot, but I had a hard time correcting them. The mechanical noises distracted me. I couldn't control the synchronization." F9: "When I heard my tongues with the earplug, I said, 'I need to use this more tidily.' I paid attention. I noticed how messy my tongue strokes were. I tried to tidy them up." F10: " "On fast sixteenth notes, my tongue and fingers don't move in lockstep. With earplugs, this became more apparent."

Table 4. Participant Opinions on the Effect of Earplugs on Articulation Techniques in Flute Performance

When the participant views on the use of earplugs are examined in *Table 4*, it is seen that the *tongue control* theme is divided into three subcategories: *harsh tonguing*, *awareness of physical tension*, and the *effect of mechanical noises*.

In the *harsh tonguing* subcategory, eight participants reported that they had experienced an awareness of this situation; this awareness transformed into an improvement in their tendency to engage in soft tonguing as a result of the discomfort they experienced.

In the category of noticing *physical tension*, participants paid attention to how hard and slow the tongue was used technically, the tension in the tongue, and the physical difficulties that arose due to this tension.

In the category of the effect of *mechanical noises*, the fact that tongue strokes create more noise when earplugs are worn, and the addition of the flute mechanism noises was evaluated as disturbing by 2 out of 10 participants. However, this discomfort also created awareness and caused the participants to make behavioral changes such as softening tongue strokes, not squeezing the flute, and playing without hitting the keys hard.

The second important theme revealed in *Table 4* was synchronization. This concept is not limited to tongue-finger harmony; it also includes the correct and balanced execution of rhythmic structures of the tongue within a certain tempo. Awareness of this theme directly affected seven participants, and statements were made regarding the need for development in this area.

As a result, the themes obtained in this section were compared with the demographic characteristics of the participants, and suggestions were developed by discussing them with the support of literature in the results section.

Conclusions, Discussion and Recommendations

This study aimed to explore the applicability of earplugs in flute techniques and was examined under three sub-objectives. The results obtained are presented and discussed below in line with each sub-objective.

The study investigated how the use of earplugs affects flutists' technical awareness and how this change relates to demographic characteristics. The main findings indicate that as participants' instrument experience increased, their mechanical awareness also improved. Notably, many participants reported that earplugs enabled them to detect previously unnoticed issues such as mechanism noise, breath control, articulation, and synchronization problems.

Under the sub-problem of posture and grip, two themes emerged: "mechanism noise" and "key striking." Although this sub-problem does not directly encompass improvements in posture, it was found to be significant in aspects such as flute grip, finger positioning, acceleration, and finger technique. When these themes were compared with participants' demographic characteristics, those with over eight years of playing experience evaluated mechanism noise and key striking more analytically, leading to technical improvements. In contrast, less experienced participants found these sounds disturbing but were less strategic in addressing them. The findings suggest that participants' instrument experience and performance levels influence the technical feedback obtained from earplugs. Additionally, a direct relationship was identified between the first sub-problem (posture and grip) and the third sub-problem (articulation techniques). The addition of mechanism noise and tongue-induced noise led participants F2, F4, and F8 to experience increased synchronization issues. However, for these intermediate and advanced participants inclined toward proactive correction, this discomfort contributed to their improvement. Conversely, beginner-level participants did not establish this connection and did not take proactive steps toward improvement. Therefore, for intermediate and advanced performers, earplugs can be used to analyze mechanical sounds and examine technical details. Exercises focusing on key pressure and articulation synchronization can be designed. For beginners, simple exercises like soft finger transitions on a single note can be suggested to raise awareness of mechanism and key sounds.

In the second sub-problem, the study examined the impact of earplugs on breathing techniques. Data analysis revealed themes of "breath control," "intonation," and "silent inhalation." The breath control theme directly affected nine out of ten participants, revealing significant awareness, particularly in breath economy, airflow speed, and diaphragm usage. Participants identified factors affecting breath control, such as unnecessary inhalations and insufficient breaths, which they previously did not notice. When compared with demographic characteristics, intermediate and advanced participants focused on advanced techniques like breath economy and diaphragm usage, seeking solutions, while beginners identified basic issues like breath noise and throat tension but struggled to find solutions. Under the silent inhalation theme, about half of the participants reported being disturbed by the sounds they made while breathing, highlighting a technical deficiency that affects performance quality. The most striking finding was that earplugs had negative effects under the intonation theme. Participants found it challenging to control soft note beginnings and endings due to reduced auditory feedback, leading to pitch issues. Additionally, in forte passages, they attempted to blow more air, resulting in sharpness. Participants who regularly used tuning devices showed tonal improvements but deteriorated in intonation, indicating differences between internal hearing and objective sound production. In the short term, earplugs can significantly impact breath control and silent inhalation, but long-term longitudinal studies are needed to assess their effect on intonation. Literature suggests that intonation studies often focus on pitch issues, and earplugs may have highlighted existing intonation problems.

The third sub-problem investigated the effect of earplugs on articulation techniques. Data analysis identified themes of "tongue control" and "synchronization." Ninety percent of participants reported recognizing technical problems in tongue control after short-term practice with earplugs. These included hard tongue strikes, irregular tongue movements (both rhythmically and in intensity), and physical awareness of tongue tension and heaviness. Earplugs revealed tongue technique issues that participants were previously unaware of, such as hard strikes, irregular articulation, and unnecessary muscle tension. The perception of tongue sounds like "tick" and "tock" helped participants identify technical deficiencies. In the synchronization theme, 70% of participants noticed finger-tongue synchronization issues while practicing with earplugs. Delayed tongue strikes in fast passages, irregular rhythmic distribution of articulation, and mechanical sounds disrupting synchronization perception were subcategories of this theme. Beginners showed inadequate basic coordination skills, while intermediate and advanced participants experienced increased awareness of mechanical sounds and internal rhythm perception with earplugs. Thus, earplugs can serve as an effective diagnostic tool for early detection of synchronization problems.

This research demonstrates that earplugs can be used not only as practice tools but also as a "diagnostic mechanism" to identify performers' technical weaknesses. Developing personalized exercises tailored to different demographic groups can accelerate technical development in flute education. Future studies should adapt these findings to other instrument groups and examine long-term performance effects. Additionally, earplugs can be utilized as a new "internal focus" tool in flute education, with their effectiveness enhanced by strategies appropriate to the student's demographic characteristics and level. This study examined the immediate awareness effects of earplugs following a 60+10 minute session. However, longitudinal studies are needed to assess their impact on long-term technical development. Regular use of earplugs can help students detect technical weaknesses early. Furthermore, earplugs can be used for different purposes across all performance levels. For example, "mechanical sound awareness" exercises

can be designed for beginners, while "synchronization-focused" studies can be developed for advanced performers.

In conclusion, it can safely be assumed that in flute teaching, although performers' efficiency varies according to their demographic features or some essential personalized approaches, earplugs can be utilized as effective pedagogical tools.

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