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The effect of using Turkic Orkhon script (Tamgha) writing in mouth harp notation on learning the instrument

Umut Deniz Topçuoğlu [a] 1

[a] *Near East University, Graduate Schoolof Educational Sciences, Nicosia, North Cyprus*

Abstract

In this study, the operability and teachability of the Orkhon script (tamgha writing) notation system, which was developed for the mouth harp instrument, was checked. The process in question was examined in three sub-dimensions. In this context, the structure of the notation system developed for the mouth harp instrument, the relationship between the Turkish Orkhon script and this system, and the effect of the system revealed as a result were investigated. The experimental process, which constitutes the main line of the study, was single-subject and was completed with posttest and retention tests. The experimental steps were spread over an 8-week period, one lesson per week, and were designed to teach the musical values of the Orkhon script in the notation system. The statistical data of the experimental test results were analyzed and evaluated. The results about the Orkhon script notation training and experimentation process are listed and finally, objective suggestions are put forward.

Keywords: Turkic Orkhon script (tamgha), mouth harp, notation, learning instrument

1. Introduction

The mouth harp is an ancient Turkish instrument that has been played by the Turks for thousands of years, transferred to the communities living in the regions they live in as a result of various migrations, and has many distinctive timbral elements. It still constitutes an important part of the local art culture of today's Turks. Central and northeast Asia are the geographies where the instrument in question is used most intensively and where it is most widely known. It is the most traditional and respected instrument of the Sakha Turks living in the Republic of Yakutia, the largest region of the Russian Federation. In the language of the field, this instrument is called “Homus (хомус)”. Again, in Yakutsk, the capital of Yakutia, there is a museum of mouth knives with a very extensive content (People of the World Khomus Museum and Center).

Considering the regions where the Turks live today, it can be said that mouth harp is not only included in the local music cultures of the tribes and/or states in the west, but also forgotten by the majority of the society. On the other hand, Musicologist Bakx states that although there is no tradition of the

1 Corresponding author Umut Deniz Topçuoğlu ORCID ID.: https://orcid.org/0000-0002-2518-6636
E-mail address: umutdeniztopçuoglu@gmail.com

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"Khomus" instrument in Turkey, the names "Ağız Tamburası" and " Ağız Muzikası" have been identified (Koçkar & Koçkar: 2016).

Mouth harp is called by many different names, depending on the region it is in and the culture and language structure there. Some selected examples are; in Mari El Republic which is in Russian Federation, "Kovıj" (Nikiforov, 1959: 70), Chuvash Republic, Varamtuna (Krivonosov, 1939: 2749), in Afganistan: chang; in Belarus: drymba; in Bosnia: drombulja; in England: gewga, Jew's harp, Jew's trump, jawharp, jaw's harp, juice harp; in Kazakhstan: Şan-kobuz; in Kyrgyzstan: temir-komuz (irom komuz), ooz-komuz in Hungary: doromb; in Malaysia: bungkau, turiding, gurudeng, junggotan, juring rangguin, rangoyd, rangun, jyrin, tumran, suup-tumran; in Germany: Maultrommel (mouth drum), mondtrom; in Mongolia: khel khuur, aman khuur, aman tobshuur, khulsan khuur, temür khuur, tömör khuur; in Uzbekistan: chankovuz, chang-kobuz; in Pakistan: chang, morchang; in Poland: drumla; in Romania: drâmbă, drîmba, drîmboaie, drîmb, drînd, drînda, drîng; in Russia: vargan; in Bashkortostan: kubyz, kumyz, ağaç-kumyz, ağaç-kubyz, temir-kubyz; in Tuva: khomus, homus, komus, xomus, in Yakutia (Republic of Sakha): khomus, in Khakassia: temir khomus; in Tibet: kha-rnga; in Turkmenistan: gopuz; in Ukraine: drymba, drumlya, doromba, organ, vargan, vigran; in Japan: Nihonjin: koukin (mouth harp); in Ainu: mukkuri; in Cambodia: angkuoc (Koçkar & Koçkar, 2016). In Turkic languages, it is mostly seen as derivatives of the word Kopuz (Khomus, Homus, Kubız, Komuz etc.). However, this name tradition was not preserved in the Turkish states in the west compared to Central Asia, and a differentiated naming was made under the influence of other languages.

Undoubtedly, shaman (in Turkic "kam") rites are at the forefront of the areas where the mouth harp instrument was used in history. Of these rituals, the shaman use the mouth harp as a means of going into a trance. In Tuvan shamanism, a strong shaman would never hold a ritual without his own drum and robes, while weaker shamans relied only on metal mirrors (küzüngü) or mouth harp (homus). While the presence or absence of an object in the Tuvans indicates the symbolic power of the shaman, among the Yakuts this situation defines two opposite categories of shamans (J. Myrza, 2013). They sing by imitating animals rather than melodiously playing. Along with the drum and throat singing for the shamans, the mouth harp is also an important part of the rituals. Today, with the continuation of this situation, this instrument has started to reach wider masses and increase its awareness with the ease of information sharing brought by the communication age. Instrumentalists trained in the Republic of Yakutia, such as Olena Podlujnaya and Vladimir Domridontov, promote the instrument and themselves using various social media tools, and give concerts in many parts of the world.

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There is no notation technique for the mouth harp instrument that is generally accepted and used as a common musical system. It is predicted that this situation arises from the auditory transmission as seen in some other parts of Turkic culture. The fact that the instrument in question has a unique category and is separated from other musical instruments in terms of timbre and playing style creates difficulties in writing notes. On the other hand, the lack of writing order of the instrument also causes different problems related to it. The most important of these is the problem of producing a composition and being able to record this work and transfer it to someone else. In this case, there are deficiencies in musical notation archive and musical notation learning, in terms of giving musical instrument education in a systematic way. In order to eliminate these deficiencies and to create a written archive, the mouth harp notation technique, which was developed using the Orkhon script writing, is suggested as a general system for expanding the boundaries of the instrument.

Orkhon scripts are basically a syllabic alphabet, which is known as Göktürk by academic context, used by Turks in the pre-Islamic period and whose origin is also based on Turkic rock paintings (petroglyphs). This alphabet is also referred to as "Runic" writing. Old Turkic inscriptions are the first known written texts. These texts were written in Turkic runic letters on various objects, especially stones and rocks. It was mainly dictated by the khagans and beys of the second Turkic Khaganate (681-743) period (Aydın, 2018).

This research aims to check that a notation system can be developed for the mouth harp instrument using the Orkhon Turkic script writing, and that this notation method can be taught with a study with a single participant, and to reveal the results. At this point the research question of the study was formulated as; “What is the effect of using Turkish Orkhon script (Tamgha) writing in mouth harp notation on learning the instrument?”. Based on this main research question, the sub-research questions were stated as in the following:

1. How can a musical notation system be created for the mouth harp instrument?
2. How can the Turkic Orkhon scripts be associated with the mouth harp notation system?
3. What is the effectiveness of the created notation system?

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1.1. Review of Literature

In this section, explanations, definitions and information about the researches available in the related literature are given. It is thought that mentioning the various meanings of the word "kopuz" and the dictionary research containing these meanings is important in terms of understanding the starting point of this research. The meanings of the word "kopuz" in different dictionaries are listed below, with its sources given.

Kopuz: *ut, kopuz*
Kopuzlug: *sazı, kopuzu olan*
Kopza-: *kopuz, ud çalmak*
-dı
-mak
-r

Kopzal-: *ud, kopuz çalınmak → kopsal-*
-dı
-mak
-ır
Kopzaş-: *kopuz, ut çalmada yarışmak*
-dı
-mak
-ır
Kopzat-: *ut, kopuz çaldırmak*
-dı
-mak
-ır

(Kaşgarlı Mahmut, Dîvânu Lugâti't-Türk, akt. Ercilasun vd., 2018, sf, 729)

Kopuz: *Tr. Orta Asya ozanlarının kullandığı telli halk çalgısı.*
(Müzik Cep Sözlüğü, Uluç, 2015, sf, 131

ETü: [Kaşgarî, Divan-i Lugati't-Türk, 1073]
kopuz [[mızrapla çalınan çalgı, ud]]

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TTü: [Mesud b. Ahmed, Süheyl ü
Nevbahar terc., 1354]
çıkup taχte aldı kopuzı ele / ki gönlini egleye bir dem çala
<<ETü kopuz telli bir çalgı
Not: Karş. ***Moğ*** *kuġur/kubur (a.a.).*
(Nişanyan, Çağdaş Türkçenin Etimolojisi)

The Scope of Meaning and Etymological Structure of the Word "Kopuz"

The word “kopuz” has a quality that defines the expression "a stringed[2] instrument" in various sources and especially in dictionaries, and it is also emphasized that this instrument is a part of the ancient poetic tradition of the Turks. It is seen that the actions such as "kopzalmak, kopzaşmak, kopzatmak", derived from the word "kopuz" and included in the Dîvânu Lugâti't-Türk work of Kaşgarlı Mahmud (1008-1102), also express the variable interactions with this instrument.

It is known that this word is expressed in different ways in Central Asian Turkic peoples. Accordingly, in some regions, the same word defines not only a stringed[2] instrument, but also a stringed[3] instrument. An example of this stringed[3] instrument can be given as Kıl Kopuz, "Kılkobız" (кыл-кобыз) in Kazakh language. The names of traditional musical instruments in Turkic dialects are derived similarly. For example, In Kazakhs, “kılkopuzu” (two stringed instrument, Turkish: kopuz) is pronounced as “topşur”, “ikili” in Altay, “uh” in Khakas “igil” in Tuvan. On the other hand “Şerter” (stringed), in Khakas “homıs” (two stringed instrument) (Butanayev 1999: 188), in Tuva “dopşulur çanzı”, in Sakha “kırımpa” Şankopuz (gubuz), in Altay “komus”, Khakas and Tuvans are used as "temir homus, demir homus". (Sarıbayev 1980: 76-77). This situation reveals that different instruments belonging to different organological categories are expressed with the same term. A similar use applies to the mouth harp. This instrument has a different structure from both stringed[2] and bowed stringed[3] instruments, and therefore has an instrument category, with its playing style, timbre, tone sequence, pitch and many different features. However, as can be seen, it is defined with the word “kopuz” again. In Central Asia, "kopuz" is seen in three ways. One of them is the "kıl kopuz", the other is the “mouth harp” (ağız kopuzu), and the other is the “kopuz” which is looks like “saz/bağlama” in Turkey.

[2] Stringed musical instruments like guitar, ukulele, banjo.
[3] Stringed (bowed) musical instruments like, violin, violoncello, contrabass.

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In order to analyze the reason why the word “kopuz” is used as a common term to describe different types of instruments without distinguishing its derivatives in different Turkic languages, it is necessary to determine the equivalent of the syllable "kop", which is the root of this word, in our language. The information about the root "kop" examined under the work "kopuz" in the third (3rd) edition (p. 436) of Prof. Dr. Tuncer Gülensoy's *"The Dictionary of the Origin of Turkish Words in Turkey Turkish (Etymological Dictionary)"* is as follows:

kopuz ‘Ozanların çaldığı telli Türk sazı‘

= OT. ***ḳubuz*** ‘ut, kopuz’ (DLT)

< ****kop-*** ‘(sesle ilgili olarak) patlamak, yankı vermek’+-°Ƶ

TT.: KOPUZ+ (CU)

An.ağl.: kopuz ‘1. Boğaz, dar yer; 2. Düz alanlarda görünmeyen oyuklar, çukurlar; 3. Deniz kıyısındaki girinti, körfez’ (DS. VIII, 2922) [An.ağl.’ndaki ***kopuz’***un ET’deki ***kobı*** ‘boş’ sözcüğünden **+-z** eki ile türetilmiş olduğu düşünülebilir]

~ kobuz (Uyg., OT), kobus (Şor), kubız (TatK.), kθbθz (TatK.), koßĘs (Çuv.), kußĘs (Çuv), komus (KKırg.), komuz (Kmk.), komıs (Bar., Oyr.), homıs (Hak.), homus (Soy.).

Ongoing sound changes-transitions in different Turkic languages are also stated in the same item as follows:

KO(>U)**B**(>M, ß)**U**(>I, Ę)**Z**(~S)

In addition, the Mongolian equivalent has been added to the end of the relevant item in the dictionary. The similarity of the Turkish and Mongolian words "kopuz" is an important historical and linguistic indicator that the word belongs to the pre-Islamic period.

~Moğ. (*KWb*. 201) ***ḳuġur***, ***ḳuur***

< (Poppe, 110) * ***ḳopur***

Another point that should be mentioned is the relationship between the **"r"** and **"z"** sounds between Mongolian and Turkish languages. In Turkish, it has been determined that the consonant **"r"** at the end of the word turns into a **"z"** consonant over time.

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Mr. Gökbey Uluç, the founder and chairman of the Turkish Language Association, teaches the Turkic Orkhon script and categorizes the various letters (tamgha, script) in this alphabet in his book "Göktürkçe Öğreniyorum". In this work, Mr. Uluç has reflected some situations that will serve as an example to this subject, in the sections of "Oturaklı Damgalar" and "Dalgalı Damgalar", by making etymological quotations from Proto-Turkic and Mongolian languages.

From the "Oturaklı Damgalar" Section:

> "*For some unknown reason, maybe it was because of a trend; make the /r/ sounds at the end of words buzz like a bee. Thus, the word that is *höör in Proto-Turkic loses the /h/ sound in the period when the Orkhon inscriptions, which we call Old Turkic, were written and took the form of "ööz". It is the word "öz" today in Turkish language."*
>
> *"The /z/ script used in Turfan manuscripts is the clearest evidence of the transition. Apparently a line is drawn up from the right side of the /ar/ script, then curved to the left. In the next manuscripts, although the line was drawn to the right of the /ar/ script again, but this time downwards, it was not curved. Thus it took its final form."* (Uluç, 2020)

As it can be understood from these expressions, the **"r-z"** transformations between the words we use in Old Turkish and today, and the evolution of the scripts in the Orkhon inscriptions are explained as examples. In addition, it has been revealed that this situation continues in today's Mongolian and its relations with today's Turkish language.

From the "Dalgalı Damgalar" Section:

> "*The sound /ny/, which we lost by not being in our language, has come to our day as /y/: *nyar > yar > yaz, *nyür > yür > yüz. In Mongolian, it turns into /n/: *nür > nüür."* (Uluç, 2020)

In the light of these historical and linguistic examples, in the use of the word "kopuz" in various Turkic dialects, which is also mentioned in the work *"The Origin of Turkish Words in Turkey Turkish"*, which we are examining, **"z"** and **"s"** sounds are seen at the end, while the **"r"** sound is seen in Mongolian examples of the same item. This makes it possible to deduce that the **"r-z"** transformation event is also present in the word "kopuz".

Based on the meaning of "kop" root in Turkish, "explode, echo" in relation to sound, it has been fixed with technical data that it turns into the word

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"kopuz" and its derivatives with the suffixes it takes. In this case, it is extremely important to deduce that for this word, which has the root "kop", which is used in common for different types of instruments, it is not the name of a special instrument, and that all the words kopuz and its derivatives actually express the meaning of "instrument". Therefore, the fact that the Turks defined a musical instrument with this word constitutes an extremely strong logical whole.

The Contradiction of the Term of the "Mouth Harp" (Ağız Kopuzu) and the Name of the Instrument in Turkish Language

As mentioned before, the musical instrument in question has a wide variety of names in Turkish and world languages. Although different ideas have been put forward about the origin of the instrument, when the archaeological data are examined, the fact that the oldest mouth harps is found in the geographies where the Mongolian and Siberian Turks live, significantly predominates the thought that the mouth harp is a product of Turkish culture. However, the earliest idioglotic (bone) Khomus specimen found in archaeological excavations was found in Mongolia and belongs to the first century BC. (Koçkar & Koçkar 2016).

In Turkey Turkish, when the vocabulary on this subject is examined, it is seen that there is more than one expression used for this instrument. Some of these terms were taken from the Central Asian Turkic languages and/or evolved by undergoing changes, some of them were expressed by being influenced by the structure and language of the musical culture in which Anatolian Turks were fused in the periods after the adoption of Islam, and some of them were later translated from European languages and adapted to Turkish.

Mouth Tambura and Mouth Mızıka/Muzika (Ağız Tamburası ve Ağız Mızıkası/Muzikası)

The way of thinking underlying the use of this expression is related to the word "kopuz", although not etymologically. So much so that the expression "tambura" was equated with the "kopuz", known as a stringed[2] instrument, and instead of the phrase "kopuz for the mouth", that is, "mouth kopuz" (mouth harp), it appeared as a "tambura for the mouth", that is, "mouth tambura" (ağız tamburası). The terminological structure here is directly compatible with the "tambura", which is a different instrument.

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It is seen that there is a situation similar to the use of "mouth tambura" in the form of expression "mouth muzika" (ağız muzikası). The word “mızıka” was used to describe “the one for the mouth”. Although the terms “mızıka” and “muzika” are similar to each other, they are different. However, they were used to describe the "mouth harp" instrument. Musicologist Bakx states that although there is no tradition of the "Khomus" instrument in Turkey, the names “mouth tambura” and “mouth muzika” have been identified (Koçkar and Koçkar 2016).

Ağız Arpı (Mouth Harp)

As can be seen, the use of this expression was derived by adding the word "mouth" to the name of a different instrument. However, this saying is a reflection of the word "harp" as it is often expressed in European languages. It was produced by considering the "harp" (arp), an old instrument used in Western Classical Music, by being influenced by the physical structure of a stringed[2] instrument.

Çene Arpı (Jaw Harp)

It is seen that this term is mostly directly translated from the English expression "Jaw Harp". This idiom in English changed morphologically over time and took the form of "Jew's Harp". This is definitely a change that is incompatible with the historical and cultural origin of the name of the musical instrument and is a purely linguistic phenomenon.

Mouth Harp (Ağız Kopuzu) as a Scientific Term

All of these terms, which we have briefly examined, are expressions used in Turkish language, in public language and later in written sources. Apart from these, words such as "damboi" and "dramboi", which are completely derived from the sound of the instrument, and their derivatives are also used to describe the mouth harp instrument in various languages. In other Turkic languages, word forms such as "temir komuz, temir kubız, temir komus" have caused the instrument to be called "demir kopuz" (iron kopuz) in our language.

The existence of a wide variety of expressions for the instrument in question in **Turkish** language prevents to create a common jargon in the language of science. In order to eliminate this situation, I prefer the use of the word “ağız kopuzu”. In particular, I think that terms such as "çene arpı" (jaw harp) and "demir kopuz" (iron kopuz) should be abandoned in order to avoid the technical contradictions they create regarding the structure and content of the instrument.

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So much so that, in addition to the fact that the expression "çene arpı" (jaw harp) is a translation from English, there is no physiological interaction with the "chin" in the structure of the instrument. It is a technical constant that elements such as mouth, laryngeal cavity and tongue movement play an important role in sound production, not the jaw. Even if the jaw hypothetically creates an effect on playing in very special situations, it is not such an important element that this instrument gets its name. Moreover, the term "çene arpı", from which the phrase "jaw harp" takes its origin, has undergone a morphological change and turned into "Jew's Harp", which presents an strange contradiction when these two expressions are used simultaneously in scientific sources.

On the other hand, the use of the term "demir kopuz", which is of Turkish origin, creates a technical contradiction in itself. As it is known, the mouth harp instrument can be produced using different materials. In some cases, a "composite" mouth harps can be created by using more than one material at the same time. Apart from these, in the Russian Federation, where various Turkic peoples live, experimental mouth harps are also produced. In such mouth harps, metal and wood are generally used today. However, there are mouth harps produced using only wood, bone, metal, brass and even various plastics.

I adopt the view that the term "ağız kopuzu", which I find more appropriate for Turkish language, has a higher tendency to be used because it is a more inclusive and general expression on scientific basis.

The Structure of the Mouth Harp

Mouth harp consists of some basic parts. These parts may vary depending on the design and the tone or timbre desired to be achieved. But some key areas are fixed for most mouth harps. The areas that are brought into contact with the mouth, held to keep the instrument stable, and rhythmic beats form the characteristics of the instrument.

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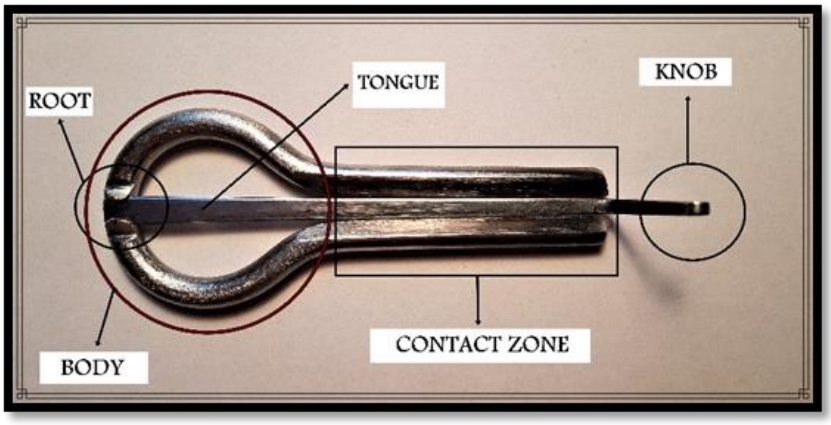

Figure 1: Basic parts of the mouth harp.
(Topçuoğlu, 2020)

In Figure 1, it represents a schematic proposition regarding the naming of mouth harp parts in the Turkish language. Accordingly, five main parts are observed in their simplest form. These are the "**root**" (kök), **"body"** (gövde) located on the left of the image, and **"contact zone"** (değinti bölgesi), **"knob"** (topuz) located on the relatively right side of the image and **"tongue"** (dil) areas occupying a large area. The region expressed as "root", is the point where "tongue" and the main building material meet. Vibration and sound acquisition are not provided here. The root point, which is indicated in the image as the joining of two separate parts, can be produced as a single piece by fusing "tongue" with the main part as a whole, on the contrary. At the same time, with finer ironwork, these two parts can be combined with screws, considering different designs, in order to be more robust and long-lasting.

The "body" is the part where the grip is made in order to keep the instrument stable in the mouth and to ensure the immobility of the area that touches the teeth. Although the grip positions in this area vary according to the design and structure of the mouth harp in question, in every traditional mouth harp, the grip area is not the part that comes into contact with the mouth and is separate from that area. In some experimental and individual studies, additional parts are added to the contact area and the instrument is held by biting it with the teeth. Thus, since both hands of the instrumentalist, who does not hold his body part, are free, he can show much more aesthetic expressions and technically variable elements related to the playing of the instrument can be obtained.

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Figure 2: The body of the mouth harp.
(Topçuoğlu, 2020)

The area defined as the "contact zone" is the area where the instrument comes into contact with the teeth in order to obtain sound from the mouth harp. In this respect, this region is the most important area for producing sound. So much so that if this part does not come into contact with the mouth and teeth, no resonance zone is formed and no sound can be obtained from the instrument. This area consists of two main parts, upper and lower, according to the grip. The upper teeth are contacted with the upper part and the lower teeth are contacted with the lower part, thus creating a resonance field consisting of the vibration of the instrument in the oral cavity. Not only the teeth but also the lips come into contact with this area. Depending on the nature of this contact, various "sound fluctuations" can be created. This can be perceived as the *vibrato* playing of a violin.

Figure 3: Contact zone of the mouth harp.
(Topçuoğlu, 2020)

The "tongue" generally defines the piece of metal that extends from the "body" part of the mouth harp to the area called the "knob". This piece vibrates according to the intensity of the beat, creating an echo in the oral cavity and producing notes at certain frequencies. Mouth harp tone can be determined according to the size of the instrument, the content and structure of the metal used. The tongue part and its bent regions play an important role in

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determining this tone. The slant of the portion approaching the knob is an important point for determining frequencies. The tongue part moves between the lower and upper teeth. The lips should be positioned so that they do not interfere with this movement.

Figure 4: The knob of the mouth harp.
(Topçuoğlu, 2020)

The area defined by the expression "knob" is the part where we hit to get the sound from the mouth harp. In the traditional playing, the wrist is bent from above and the stroke is made from the “outside to the inside”. However, in some playing styles, both outside-in and inside-out strokes can be made. At the same time, sounds can be produced in a variety of ways, not just by hitting the wrist with a free bend from above. How to hit this context depends relatively on the person. One of the most important points to be mentioned about the beats on the knob area is that in traditional playing styles, hitting is used not only to obtain sound from the instrument, but also to create an aesthetic and theatrical visual impression. At the same time, sounds can be produced in a variety of ways, not just by hitting the wrist with a free bend from above. How to hit this context depends relatively on the person. One of the most important points to be mentioned regarding the strokes made in the knob area is that in traditional playing styles, striking is used not only to obtain sound from the instrument, but also to create an aesthetic and theatrical visual impression. Various unique visual materials are presented to the audience by making very variable movements with the wrist.

Figure 5: The tounge of the mouth harp
(Topçuoğlu, 2020)

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2. Method

2.1. Research design

In the study, a quasi-experimental research design was used based on both qualitative and quantitative data. Patterns that aim to determine cause-effect relationships between variables are called experimental designs. (Büyüköztürk, 2001). In this study, the participant was determined by the researcher and the experimental process was designed according to the researcher's time of convenience. Therefore, it was not a true experimental design but a quasi-experimental research.

2.2. Participants

2.2.1. Learner: The learner in the study was selected via criterion sampling method and he was a musician who completed his M.A. at South Ural State University Faculty of Architecture Department of Fine Arts and Design in 2014. He met mouth harp in 2009 and has been actively performing and teaching for eleven (11) years. He is interested in and performing throat singing apart from the mouth harp. The throat singing and mouth harp have some musical associations. In this context, overtones are obtained from both the mouth harp and the sounds formed while performing the throat singing.

The learner also shows itself in various competitions and festivals. To these; "Solo Performing Talent" award in the "Fifth Regional Kubiz and Throat Singing Competition" (Baskortostan 2015), "Originality" award in the "Eighth Regional Kubiz and "Throat Singing Competition" (Bashkortostan 2019), first prize in the "Russian Melodies Competition" organized within the "Russian Mouth Harps Festival" can be cited as an example. Maksim Aleksandrovich Tamonov also organizes presentations and gives lectures. In addition, he founded the "Ural Mouth Harp School" in 2014 and, also, he has been working in the field of teaching online, under the name of "Secrets of Mouth Harp", since 2017.The reason why the learners was selected as a participant of this study was his high level of experience in this instrument. Not having to get acquainted with the mouth harp instrument from scratch, facilitates communication and data acquisition during the learning phase.

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2.2.2. Jury members:

At the end of the 8-week experimental period, the results of the posttest performed with the subject and the results of the permanence test performed two weeks after the posttest were evaluated by the referees consisting of 5 music experts. Two of the referees have undergraduate education in the field of music, graduate education in the field of music education, and the remaining 3 have both undergraduate and graduate education in the field of music education.

2.3. Data collection

In this experimental study, which was carried out to measure the teachability and operability of Orkhon script notation to the subject, it was aimed to be able to read the musical rhythm and melodic structure and to perceive the scripts that form the basis of the direct note system rather than the subject's solfege and theoretical knowledge.

Names of the Tamgas Used in the Experiment Study According to Orkhon Alphabet and Orkhon Tamgha Notation

(ÖK)	(EL)	(AH)	(İÇ)
(AG)	(EY)	(ANÇ)	(ES)
(AS)	(ER)	(AR)	(EK
(ET)	(AL)	(AÇ)	
(AB)	(AK)	(AT)	
(AY)	(IK)		

All of the symbols (letters) used in Orkhon script notation are referred to by their own names in the Orkhon alphabet. Some sample classes are given in the Appendix part (See appendix 1).

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3.Findings

Findings of the study are presented under each related sub-question.

3.1. Findings based on the first sub-research question

Orkhon Tamgha Notation for the Mouth Harp

There is no specific notation technique for the mouth harp that is standardized, accepted by everyone in the music literature, and currently used. On the other hand, there are various essays and notation formats created. However, it has been determined that these are insufficient to symbolize the richness of the voice of the mouth harp. These notations have a common feature, which is an effort to write the mouth harp melody that is performed only in a certain piece. In other words, the mentioned notation systems do not broadly cover the techniques that can be used in the instrument. The aim was to notate the mouth harp music revealed in the written work.

Austrian composer Johann Georg Albrechtsberger's (1736-1809) concerto in D Major can be given as an example. In this work, Albrechtsberger used a mouth harp. In the piece, the instrument can be seen both as an accompanist and as a soloist. Note writing, on the other hand, does not differ from other instruments with any originality at first glance. The mouth harp is performed quite simply in this piece. Unique timbres did not come to the fore and it supports the composition more harmonically and melodically. This situation reveals a very ordinary polyphonic harmony in terms of tonality.

When the scores of Johann Georg Albrechtsberger's D Major concerto are examined, we see that the name "*Trombula*" in the third staff characterizes the mouth harp. After a very classical introductory part, the first sounds of the mouth harp are heard in the 32nd measure. It manifests itself in accordance with the tone, mostly depending on the arpeggio movements.

From the notation style of this work, which was written for the mouth harp, basically two problems can be put forward. The first of these is to write the notes of the sounds obtained from the mouth harp like a simple soloist instrument using a single staff, and the second is that none of the original effects of the instrument are used in the composition and therefore they are not expressed in the notes. Naturally, if the composer

does not play a sound expressed by any effect or breathing, this is a preference and will not need to be written in the note. However, in the opposite case, the absence of a generally accepted system for the display and writing of these original timbres is still an obstacle and/or deficiency.

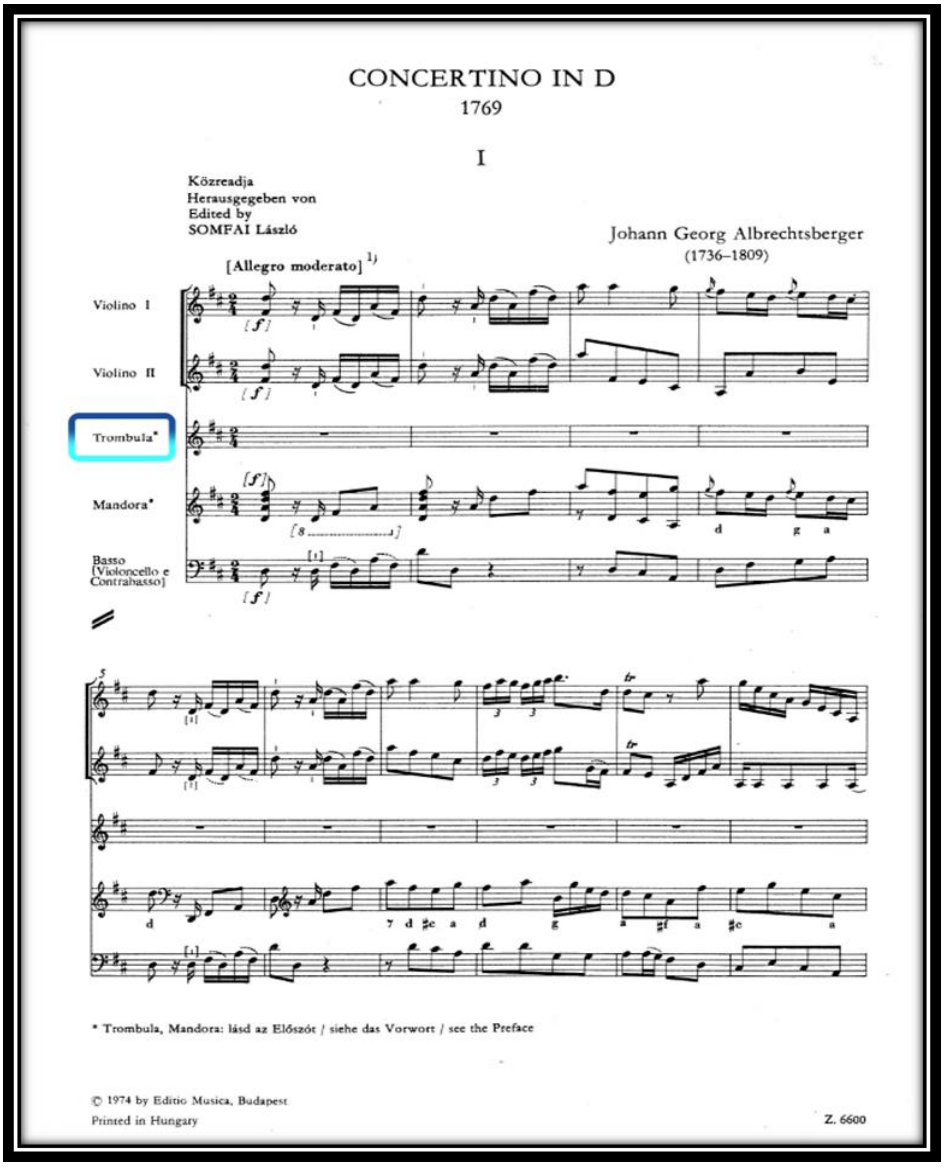

Figure 6: First page of the Johann Georg Albretchberger's "Concerto in D" (Johann Georg Albretchberger, Editio Musica, Budabest 1769)

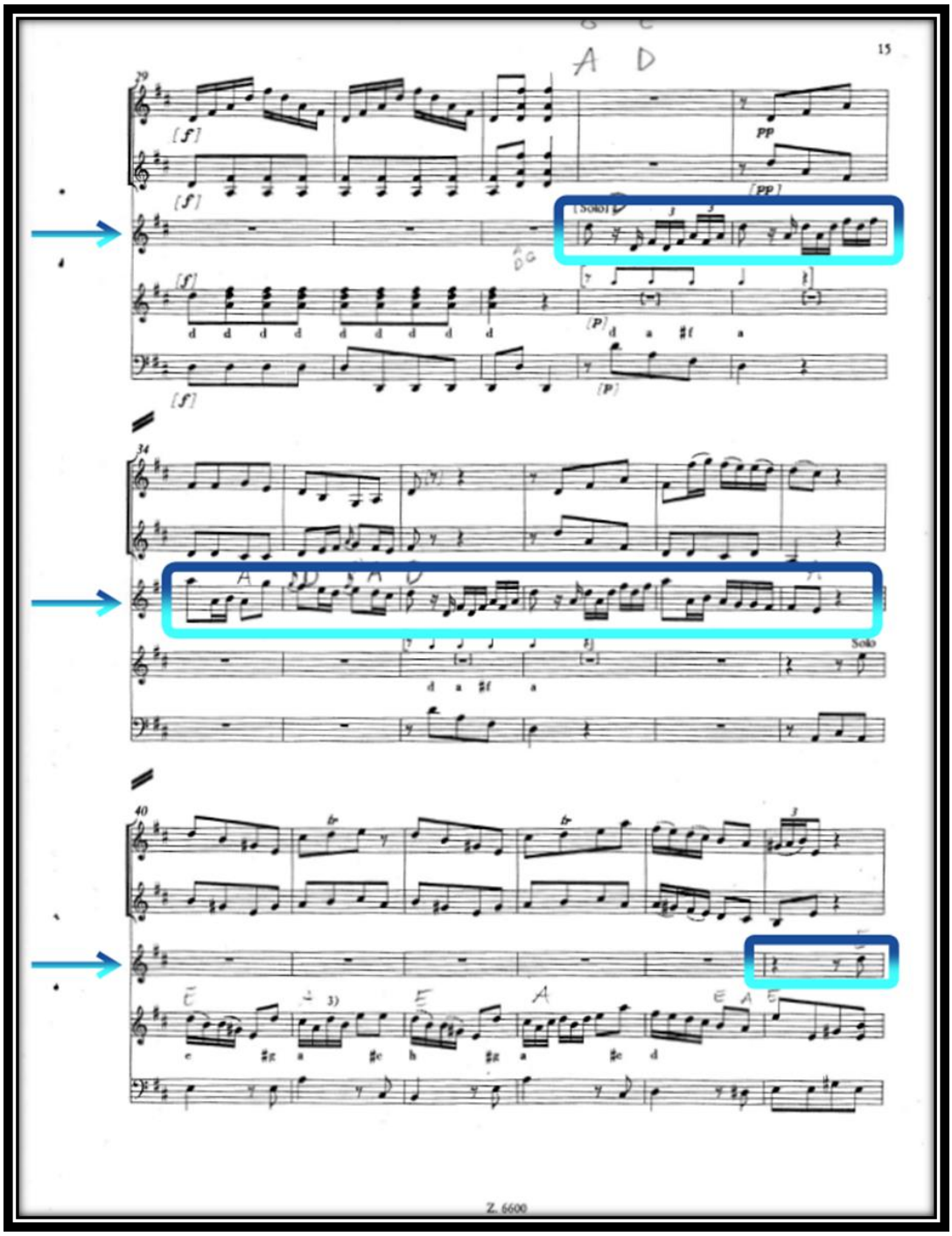

Figure 7: Tihs is the first page in which mouth harp notes are seen in Johann Georg Albretchberger's "Concerto in D"
(Johann Georg Albretchberger, Editio Musica, Budabest 1769)

Critics About Johann Georg Albretchberger's Notation

a. Critics About the Rhythm Writing

Due to the technique of playing the instrument, one hand is holding the instrument while the other hand strikes the "tongue" part of the instrument, as indicated in the previous images. This beat constitutes the rhythms in the melody in notation (such as sixteenth triplet, 1 eighth, 2 sixteenth, 4 sixteenth). On the other hand, the melody is produced by the back and forth movement of the tongue (organ) depending on the playing technique. This reveals the loudness, that is, the notes themselves. However, the problem is that rhythm patterns can be formed depending on the movement of the tounge. In this case, if the striking hand and the rhythm produced due to the movement of the tongue are compatible, there is no deficiency in the writing, while if the two elements form different rhythm scales, this cannot be written in Albrechtsberger's writing style. Because the composer did not aim to develop a system to cover this situation.

If the image below is accepted as the first case mentioned before, the arrows in the "vuruş" (beat) staff (Old Turkic, OK script/letter) represent playing at the rythmic structure (eighth) value above. In Orkhon notation system, the method of symbolizing this with a script was used in order not to write the same eighth on the stroke string in order to avoid crowding. This is the case when the weight in the melody and the weight in the beat string are equal to each other.

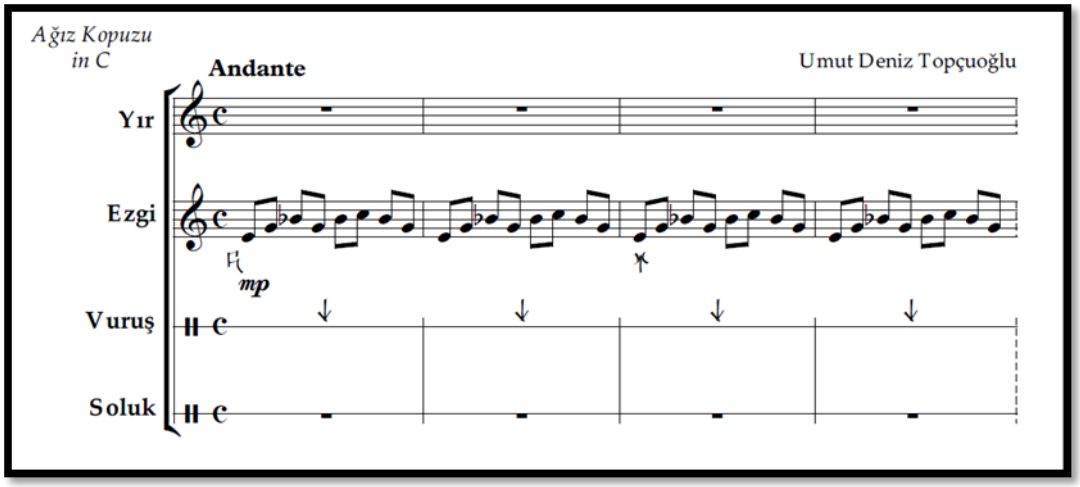

Figure 8: Second experimental composition. The first sample for, when the rhythm pattern in the melody and the rhythm pattern in the beat have a common time value in the Orkhon notation system **(Topçuoğlu, 2020)**

In the image expressing the second situation, the beats are in quarter form, but the melody has not changed and continues as an eighth with the tongue movement. It is not possible to show the difference between these two situations with the notation of

Albrechtsberger's D Major concerto. Therefore, even if it meets the value of the content in a particular work, it will not create an inclusive work and functional system.

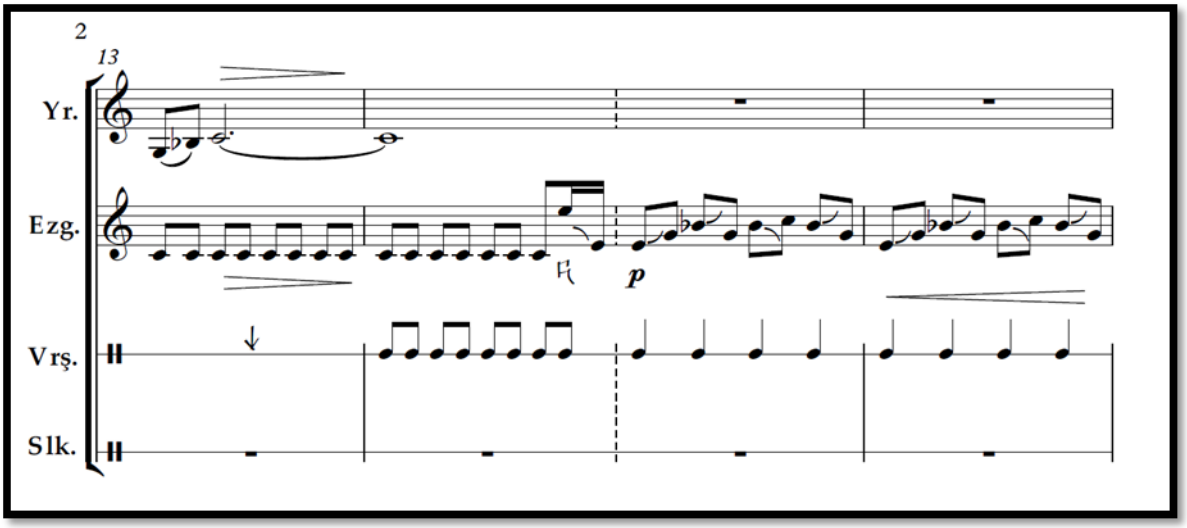

Figure 9: Second experimental composition. The second sample for, when the rhythm pattern in the melody and the rhythm pattern in the beat have a common time value in the Orkhon notation system **(Topçuoğlu, 2020)**

b. Critics About Timbral Differences and Special Effects

Various simple melodies can be put forward during the mouth harp. They can also be complex rhythm patterns. Even though the notes of the melodies are fixed, what kind of timbral "position" they are in cannot be shown without a literary expression that symbolizes them. Melodies obtained from the instrument can be written with common notes, but many effects can be produced with various letters due to the playing nature of the mouth harp. This means timbral differences. In other words, a note can be played with very different timbres and effects. Since these differences are special elements of the composition and are part of the music as a whole, they must be symbolized in the notation. Just like the pedal marks (Ped. ❋,) on the piano, the bow position symbols (V, ∏) on the violin, or the *crescendo-decrescendo* markers in a musical phrase. Likewise, these examples are written down in order to determine and show in what form and what timbral differences a certain note or musical expression will contain, or to inform a playing position in practice with notation. In the improved Orkhon script notation system, Göktürk alphabet, that is, Orkhon scripts (damga/tamgha), was used to symbolize these timbral differences.

3.2. Findings based on the second sub-research question

Musical Values and Explanations of Tamghas

Basic Techniques:

𐰇 (ÖK)

The tamgha "ÖK" symbolizes the technique called "KÖK SES" (core sound) in mouth kopuz playing. This technique is the first of the two main elements in the Orkhon script notation. The first letter of the technique's (kök ses) name in Göktürk is written in the notation to represent this technique itself. In the "kök ses" technique, the most basic and plain sounds and melodies are played with the mouth harp. These are achieved by various simple movements of the tongue. The melodic phrase that needs to be performed with "ök" is played without breathing and using any other effects. This tamgha, when applied, is written under the "melody" (in Turkish ezgi) staff.

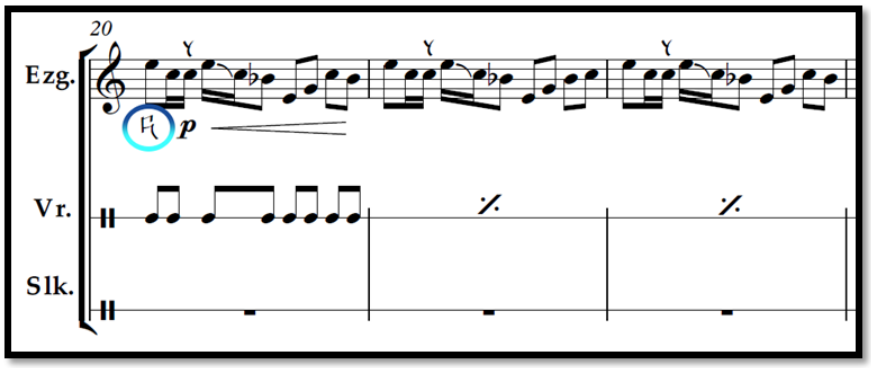

Figure 10: Second experimental composition. A written sample of the "ÖK" tamgha in the Orkhon notation **(Topçuoğlu, 2020)**

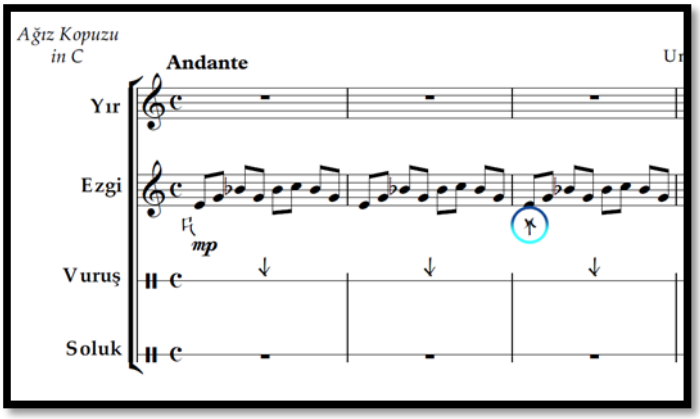

Figure 11: Second experimental composition. A written sample of the "AG" tamgha in the Orkhon notation **(Topçuoğlu, 2020)**

𐰇 (AG)

The tamgha "AG" is symbolizes the technique called "GIRTLAK" (throat) in mouth kopuz playing. This technique is the second of the two main elements in the Orkhon script notation. As in the "ök" technique, the first letter of the technique's (gırtlak) name in Göktürk is written in the notation to represent this technique itself. In this technique, even if the melodic phrase in question remains the same (octal rhythm), as in the example above, a timbral changes in the melody is revealed by using the laryngeal cavity from the moment the tamgha "Ag" is written. The "Ag" script is written under the melody string like the "Ok" script.

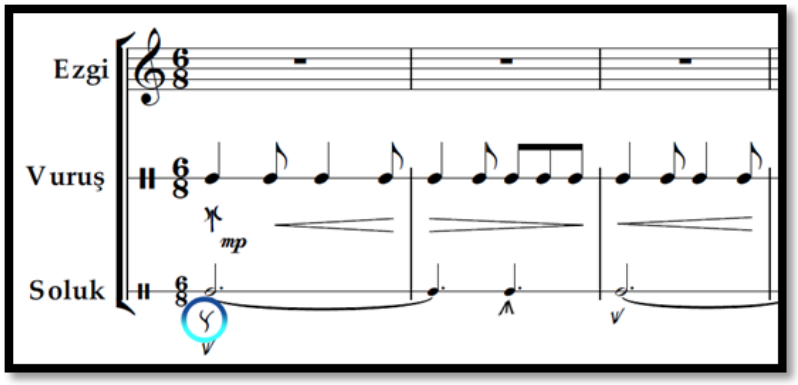

Figure 12: First experimental composition. A written sample of the "AS" tamgha in the Orkhon notation **(Topçuoğlu, 2020)**

Breathy Techniques

𐰉 (AS)

The tamgha "AS" symbolizes the technique called "SOLUK" (breathe) in Orkhon notation. Tamgha, again, is directly derived from the first letter of the word "soluk" in Göktürk alphabet. The writing of the breathing technique is shown as a separate staff and is at the bottom of the notation. Accordingly, when some other techniques are performed by breathing in and out, both the action itself and its direction (breath-in and breath-out) are indicated in this staff. If no other specific technique is specified, the "As" tamgha is used when the "breath" is exhaled. In other cases, the "As" tamgha is not written, only the tamghas reads as "AF" (𐰉 -𐰋) is used. This scripts indicates the direction of the breath. The script "af" with its fringes facing up represents exhalation, and the one facing down symbolizes breathing. Since this script is not found in the old Orkhon inscriptions, it was proposed by Gökbey Uluç under the title of "Contemporary Turkic scripts for Turkish language" in order to ensure the writability of today's Turkish with Orkhon scripts and to improve its functionality, and it was widely accepted.

𐰋 (AH)

The tamgha "AH" is also associated with the breath as a sound, although it is not actually in the language. This tamgha is written above the “melody” staff in notation and symbolizes a more sudden and explosive breathing effect instead of the simple breathing process like the "as" tamgha described earlier. The alphabetic sound produced naturally while breathing is similar to the "H" sound. Therefore, choosing the tamgha "Ah" for this operation depends on this logic. The "Ah" also, like the "Af" tamgha, was derived by Gökbey Uluç for the same purpose to add it to the modern Orkhon alphabet.

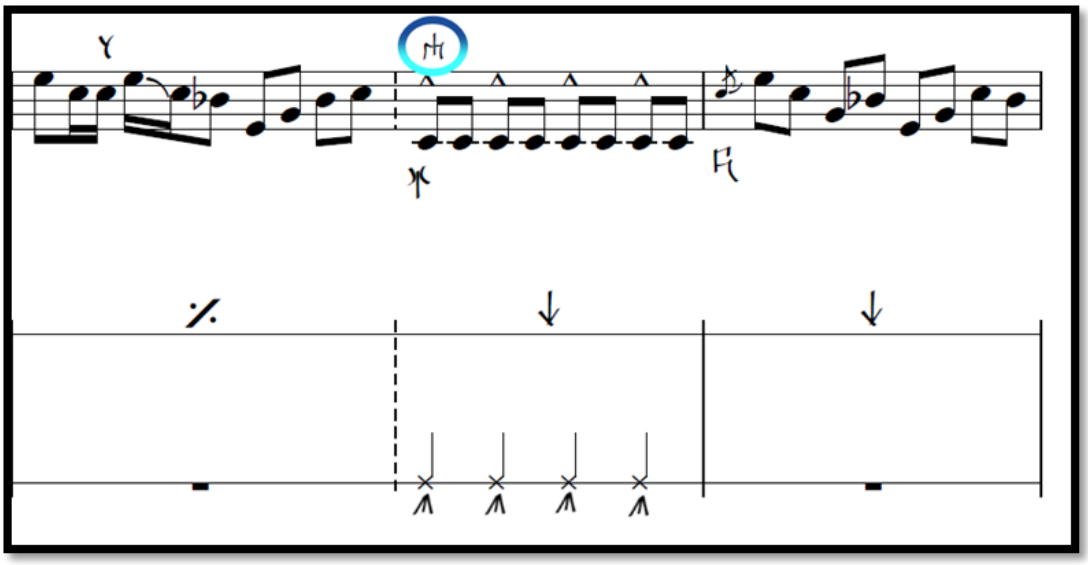

Figure 13: Third experimental composition. A written sample of the “AH” tamgha in the Orkhon notation **(Topçuoğlu, 2020)**

𐰉 (ET)

The tamgha "ET" symbolizes the "T" sound in the Orkhon alphabet and notation. Its function in notation is to convey the effect of breathing by fusing it with the "T" sound. This tamgha is written above the “melody” staff and just above the note in question. In case of repetition, "Af" tamghas, which symbolize the direction of breathing, are used. “et” takes its place in the notation depending on the **“gırtlak” (throat)** technique.

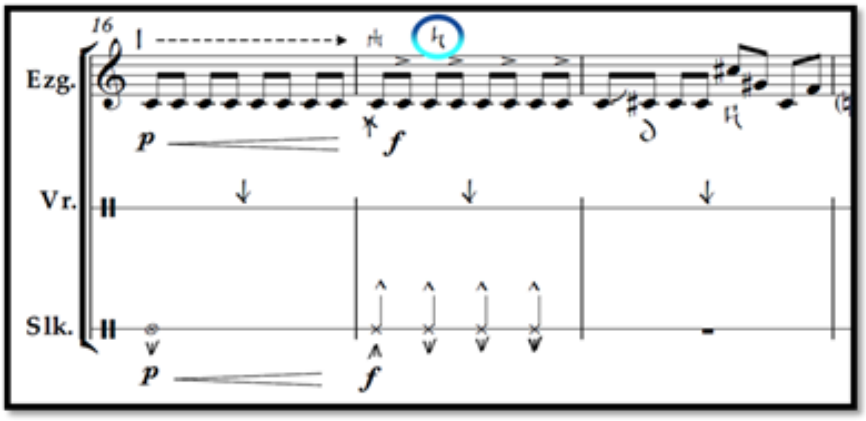

Figure 14: Third experimental composition. A written sample of the "ET" tamgha in the Orkhon notation **(Topçuoğlu, 2020)**

| (ES)

The "ES" technique symbolizes the "S" sound and it is a breathing technique as a method of playing, as it has the feature of being a continuously repeatable hard consonant. Since the mouth structure will be in a relatively difficult position physically, when it is started to be played, if another similar technique is to be performed immediately after "es", this transition is indicated by a dashed arrow in the notation. Thus, the instrumentalist is visually prepared for the situation. The tamgha is written over the "melody" staff and the "S" sound is heard directly. Correct breathing and adjustment during the playing is important for the continuity of the performance.

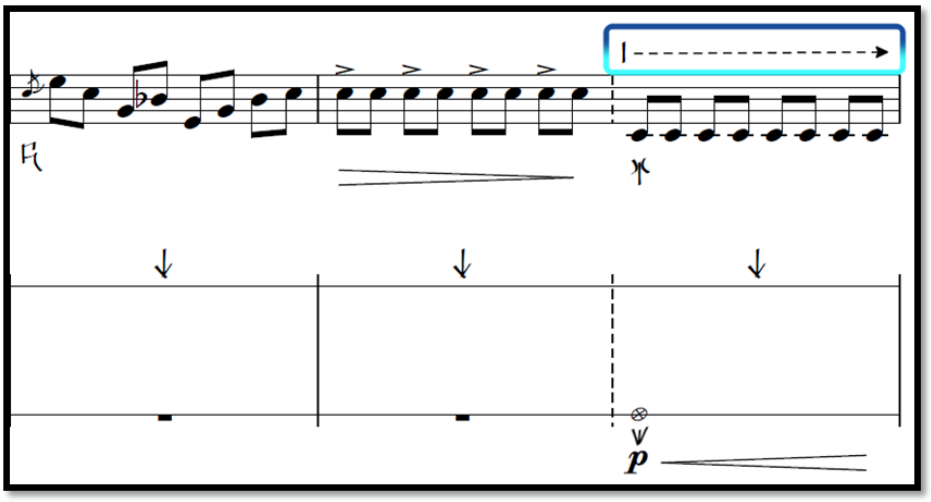

Figure 15: Third experimental composition. A written sample of the "ES" tamgha in the Orkhon notation **(Topçuoğlu, 2020)**

𐰾 (ANÇ)

"ANÇ" corresponds to the sound "NÇ" in old Turkish in Orkhon inscriptions. In the mentioned notation system, it is aimed to symbolize one of the "Ç" sounds. The aim here is to indicate in the notation that a breathy "ç" sound is played in the mouth harp, just like the "et" tamgha. "Anç" is written over the "melody" staff and the direction of breathing is indicated on the required staff.

𐰴 (IK)

The last breath technique used in experimental compositions is shown with the tamgha "IK". "Ik" is one of the five "K" sounds exist in Orkhon inscriptions ak/𐰇, ek/𐰴, ok/𐰆, ök/𐰋, ık/ 𐰴). This technique is one of the most original in the notation system. In traditional playing styles of the mouth harp, it is a usual feature for the artists to describe and vocalize the sounds in the nature they live in. In such performances, "hiccups" are often heard from the performers. Because the letter structure of this word is compatible, it meets the "ık" sound in the last syllable and it has a distinctive visuality, the "Ik" tamgha was used to symbolize the "hiccup" effect in Orkhon notation system. Again, depending on a certain rhythm, this tamgha is written above the "melody" staff.

Twin Tamghas:

𐰃 (EL) ve 𐰉 (AL)

El" and "Al" tamghas are some of the twin letters in the Orkhon script notation. Most of the consonants in the old Turkic alphabet used in Orkhon inscriptions are separated according to their thinness-thickness. Because some are used with thin vowels, while others have to be used with thick vowels. It has been determined that this is a very functional and useful grammatical phenomenon to distinguish the “Kök Ses and Gırtlak” (root sound and throat) techniques, which are the basic playing methods of the mouth harp instrument.

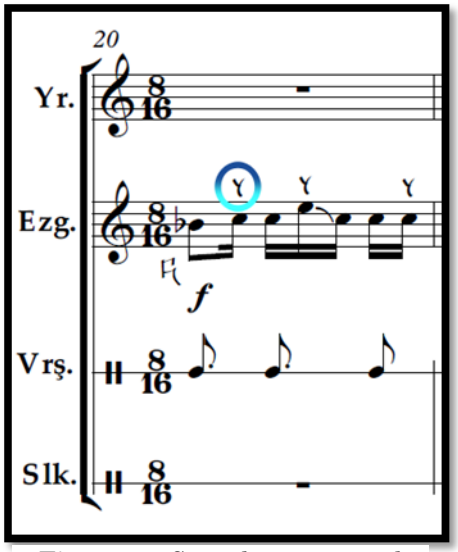

Figure 16: Second experimental composition. A written sample of the “EL” tamgha in the Orkhon notation. **(Topçuoğlu, 2020)**

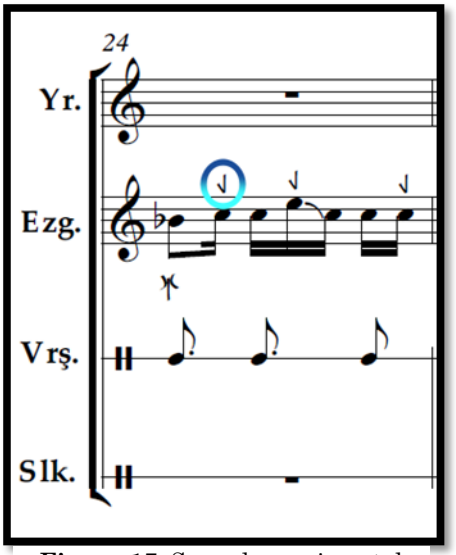

Figure 17: Second experimental composition. A written sample of the “AL” tamgha in the Orkhon notation. **(Topçuoğlu, 2020)**

Some other tamghas are connected to the "ök" technique and some to the "ag" technique. "El" and "al" sounds are written directly above the "melody" staff and the note they are played with. This means that the note in question should be played with an "L" sound effect. While the "el" tamgha is connected to the “ök” (kök ses) technique, the "al" tamgha is connected to the "ag" (gırtlak) technique. Therefore, there is a very deep timbral difference between them.

𐰀 (EY) ve 𐰃 (AY)

These two tamghas are twins, just like the "el" and "al" tamghas. Likewise, they connected to the "kök ses" and "gırtlak" techniques. The "ey" and "ay" scripts represent an effect associated with the "Y" sound made when playing the mouth harp. As a spelling rule, they are not separated from "el" and "al" scripts, they are written right above the "melody" staff and the note to be performed.

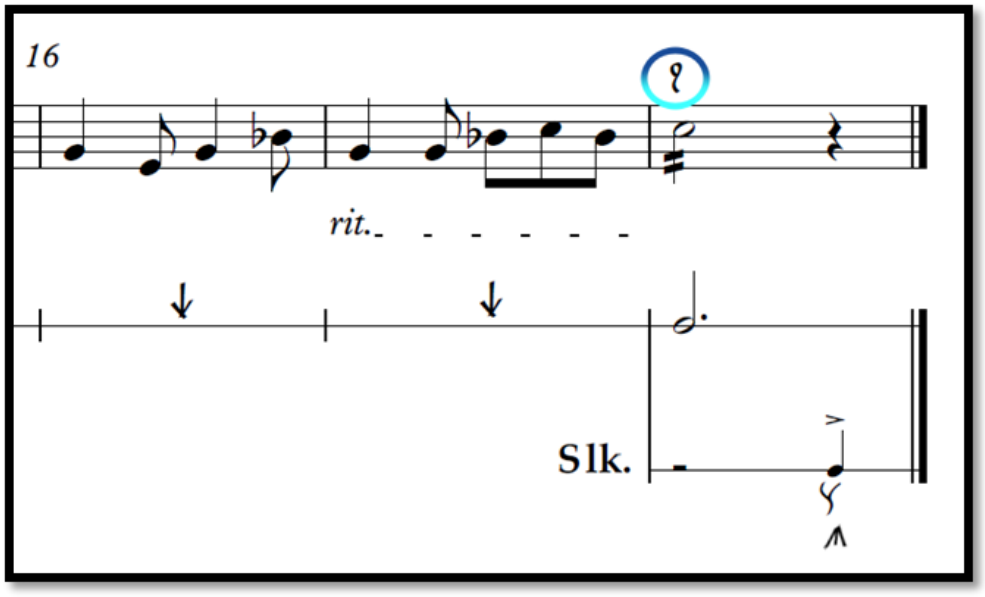

Figure18: First experimental composition. A written sample of the “EY” tamgha in the Orkhon notation **(Topçuoğlu, 2020)**

𐰆 (ER) ve 𐰇 (AR)

In the same way, “R” sound effect is obtained in Orkhon script notation through these twin tamghas, which vary according to their thinness-thickness. This technique is generally demonstrated by performing a continuous "R" sound. The tamgha "Er" is written in the "kök ses" and the "Ar" tamgha is written in the "gırtlak" technique, and there is a distinct timbral difference between them. They are written above the "melody" staff and the note in question.

𐰃 (EK) ve 𐰴 (AK)

Another twin tamghas used in the experimental compositions are "Ek" and "Ak" tamghas. Both of these tamghas create an effect associated with the "K" sound. As in the others, according to the thinness-thickness changes, "Ek" sound depends on the "kök ses" technique, and the "Ak" sound depends on the "gırtlak" technique.

𐰇 (İÇ) ve 𐰼 (AÇ)

The last twin tamghas of the experiment content are "İÇ" and "AÇ" tamghas. These tamghas create an effect associated with the "Ç" sound. Again, depending on the main techniques of "kök ses" and "gırtlak". They are written above the "melody" staff and the note in question. "İç" sound depends on the "kök ses" technique, and the "aç" sound depends on the "gırtlak" technique.

Other Techniques:

𐰉 (AT)

"AT" symbolizes the letter "T" and it is a tamgha performed depends on the "gırtlak" technique. A hard "T" sound is produced directly from the mouth harp. It is written above the staff "melody".

𐰆 (AB

This tamgha corresponds to the "B" sound in the Orkhon inscriptions. It takes its place in the Orkhon notation system directly from the first letter of the word "basmak" (to push) and enables the "*staccato*" to be played by putting a pressure on the moving "tongue" (part of the instrument) with the help of the fingers or lips contracting during the mouth harp playing. However, this is not the only purpose of this tamgha and the element it symbolizes. "Ab" script is used when pressure is applied to the tongue and it is desired to make a "melodic sound change". As a result of this pressure, the melody generally obtained from the instrument becomes "half-tone" high. Except for this case, all "*staccato*" expressions are shown with the classical notation method. Since there are different ways of obtaining "*staccato"* in mouth harp playing, the method should be indicated in parentheses above the "melody" staff. If there is no "*staccato"* as a result of pressure, but the voice still becomes high-pitched, the "Ab" tamgha is definitely written to show that this high-pitchedness is the result of a physical intervention. "Ab" is written under the "melody" stave.

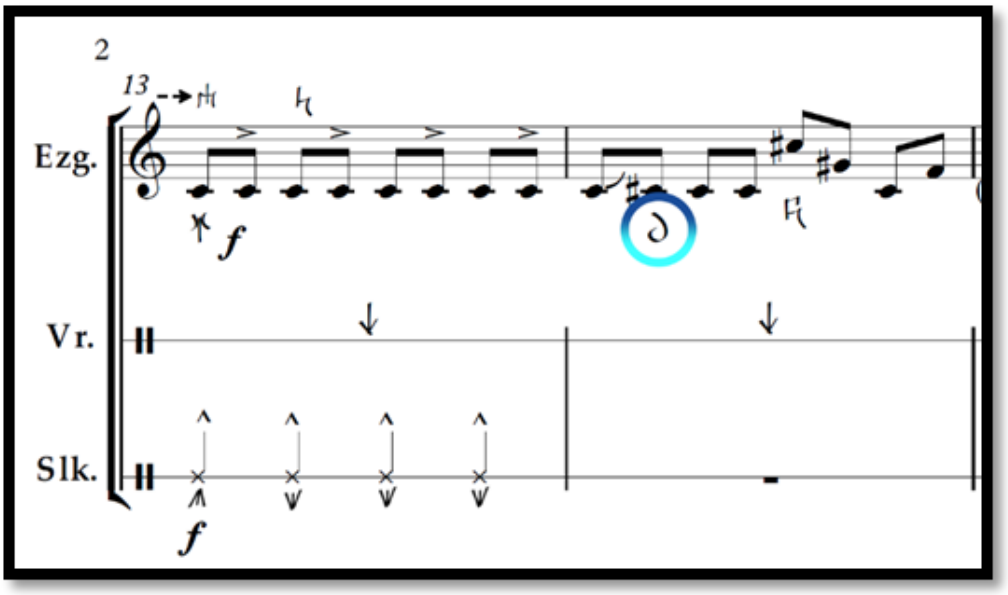

Figure 19: Third experimental composition. A written sample of the "AB" tamgha in the Orkhon notation **(Topçuoğlu, 2020)**

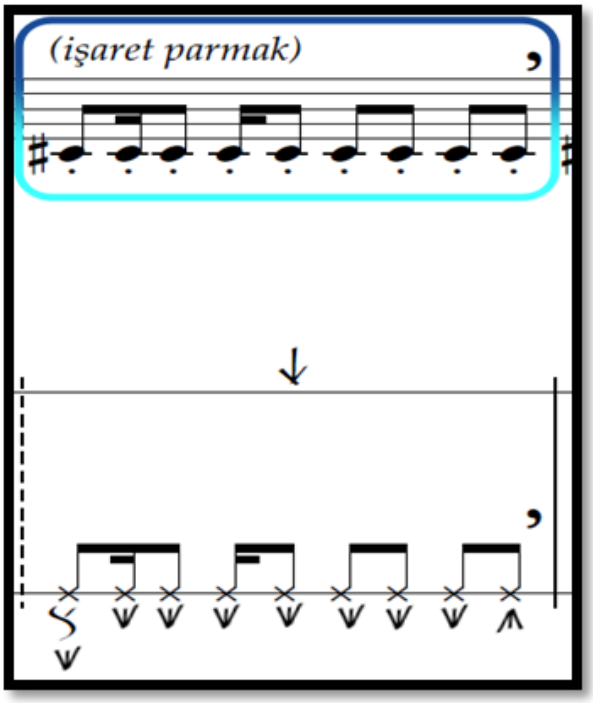

Figure 20: Third experimental composition. A written sample of the "staccato" in the Orkhon notation **(Topçuoğlu, 2020)**

3.3. Findings based on the third sub-research question

Table 1. Participants' Posttest and Permanence Test Scores

	Final		Permanency		Z	p
	$\bar{x}$	s	$\bar{x}$	s		
A1	4,60	0,55	4,60	0,55	0,000	1,000
B1	4,80	0,45	4,80	0,45	0,000	1,000
C1	4,20	0,45	4,20	0,45	0,000	1,000
D1	4,60	0,55	4,60	0,55	0,000	1,000
E1	4,40	0,55	4,40	0,55	0,000	1,000
A2	4,40	0,55	4,40	0,55	0,000	1,000
B2	4,40	0,55	4,40	0,55	0,000	1,000
C2	4,40	0,55	4,40	0,55	0,000	1,000
D2	4,40	0,55	4,20	0,84	-1,000	0,317
E2	3,00	0,71	1,60	0,55	-2,121	0,034*
A3	4,20	0,45	3,80	0,84	-1,414	0,157
B3	4,60	0,55	4,40	0,55	-1,000	0,317
C3	3,20	0,45	1,80	0,84	-1,841	0,066
D3	4,40	0,55	3,80	0,84	-1,732	0,083
E3	4,40	0,55	4,40	0,55	0,000	1,000
A4	4,60	0,55	4,60	0,55	0,000	1,000
B4	4,60	0,55	4,60	0,55	0,000	1,000
C4	4,40	0,55	2,80	0,45	-2,060	0,039*
D4	4,80	0,45	4,80	0,45	0,000	1,000
E4	4,60	0,55	4,60	0,55	0,000	1,000
A5	4,60	0,55	4,60	0,55	0,000	1,000
B5	4,40	0,55	4,40	0,55	0,000	1,000
C5	4,40	0,55	4,40	0,55	0,000	1,000
D5	2,60	0,55	1,80	0,45	-1,633	0,102
E5	3,20	0,45	2,00	0,00	-2,121	0,034*

*$p<0,05$

When Table 1 is examined, it is seen that the highest score given by 5 different referees to the 25 questions answered by the subject in the posttest study is 4.80 and the lowest is 2.60. In the permanence test, it is seen that the highest score given is 4.80 and the lowest is 1.60. E2 0.034*, C4 0.039*, and E5 0.034* permanence test scores were found to be significantly lower than posttest scores.

Table 2. Consistency between the Evaluators' Scores (ICC)

		%95 G.A.			
	ICC	**Lower**	**Upper**	**F**	**p**
Part 1	0,822	0,338	0,979	5,630	0,005*
Part 2	0,756	0,089	0,972	4,095	0,018*
Part 3	0,863	0,489	0,984	7,304	0,002*
Part 4	0,750	0,068	0,971	4,000	0,020*
Part 5	0,703	-0,107	0,966	3,368	0,035*

When Table 2 is examined, the level of consistency of the scores given by 5 different referees to the 25 questions answered by the subject in the posttest study was calculated and it was determined that there was a statistically significant consistency between these scores. ($p<0,05$).

4. Discussions

It has been determined that in writing mouth harp instrument notation, in order to eliminate the rhythmic contradictions that arise, the rhythm pattern obtained from the instrument itself depending on the movements of the tongue to create melodies and the rhythm patterns obtained from the beat applied in order to make a sound from the instrument should be separated. In this context, it is foreseen that in addition to the staff on which the melody is written, a second staff on which the beat rhythms are written should be added.

A second shortcoming is that no matter what notes they are, they can be played with many different timbre features. If we are to call them effects, each of them is performed with a different technique. For example, the “C” (do) note can be played with multiple effects, adding different timbre features. Here, these original timbres can be obtained largely by using some consonants. As another example, the note "La" (A) can be played with sounds that reflect the "T" effect, the "S" effect, or the "L" effect.

This shows that there is more than one “La” note type/timbre, technically and especially auditorily. This diversity is not related to the frequency value of the note in question, but

to the tone color. In such a case, it has been determined that a separate symbolism should be used to visualize these techniques inherent in the instrument.

The Austrian composer Johann Georg Albrechtsberger's D Major concerto, which is an early example of mouth harp notation, did not aim to show this rhythmic distinction in his writing, and such a variable was not observed in his work. Instead, because the beat rhythm and the rhythm pattern in the melody are always equal, a single staff is used in music.

As a different example of comparison, in Roy Smeck's work "*Fun With The Jaw Harp*", it is seen that there are 10 different songs written for the mouth harp. In the notation system here, Smeck aimed to reveal a certain relationship difference between beat and melody in writing by using 4 different signs/symbols. However, none of these signs does not eliminate the contradiction between the beat rhythm and the rhythm pattern in the melody mentioned before, and also does not bring any innovation in terms of timbre differences and effects. On the other hand, as it is often mentioned, only the notation of the music in question was tried to be written, but the production of a general mouth harp notation system was not aimed.

As another example, in Mark Growden's *"Sixty Three Melodic Exercises For The Jaw Harp",* a single staff is used, as in Albrechtsberger's concerto in D Major, and there is no special symbolism. It is seen that the purpose of this study is to present an exercise of the melodies played as the most basic and plain sound obtained from the mouth harp instrument.

In the Orkhon script notation study, solutions were sought for rhythmic contradictions and other different problematics with additional staffs, and the playing of the same notes with different effects and timbres was uniquely expressed in note writing with symbols. Thus, a more inclusive study has been presented on the structure and boundaries of the mouth harp instrument.

The mouth harp instrument is physiologically directly related to breathing and, most importantly, tongue movements in terms of sound production. With the movements of the tongue, the volume of the sound obtained from the instrument can be regulated as a result of filling the empty spaces in the mouth in different ways. This creates the notes. The information expressed here also applies to the formation of letters in terms of linguistics.

Just as our language takes various forms in order to say vowels and consonants, it also takes similar forms to provide sound production and control of notes while playing the "mouth harp". According to the logical inference arising from this similarity, it is envisaged that mouth harp techniques produced using letters, naturally can be expressed in notation system of course with letters or to be more specific, with symbols that have letter value. In this context, it was decided to use the Turkic tamghas which in the

Orkhon inscriptions, in the created notation system to represent the original timbre techniques obtained from the mouth harp instrument. When the Orkhon inscriptions, from which the notation takes its name, are used for the mouth harp, it has been determined that another harmony emerged in terms of symbolizing the tones. Accordingly, there are basically two important and main situations/positions in mouth harp playing. These can be divided into two as using the laryngeal cavity and not using it. In the Orkhon notation system, these two situations are called "kök ses" and "gırtlak" techniques. So much so that there is a sharp difference between these techniques. When the laryngeal cavity is used, the sound is heard more deeply and muffled.

All effects and special sounds produced with letters depend on these two techniques. There is a thinness-thickness relationship between these techniques. Techniques that can be described as thin depend on the “kök ses”, and those that can be described as thick depend on the “gırtlak” technique. This situation plays a key role in the use of the Orkhon alphabet. This is because the Orkhon alphabet is a syllabic alphabet and consonants are separated according to their thinness and thickness. So the vowel harmony, for example, the script "AL" symbolizes the thick "L", and the "EL" script symbolizes the thin "L".

The case of the mouth harp performance, whether the larynx is open or closed, or whether the larynx is used or not, is directly compatible with the thinness and thickness distinction of Orhon tamghas. In this context, it has been determined that this situation facilitates symbolization and is also a definite result of the partnership of musicology and linguistics. As an example of this harmony, an "L" sound played in the "kök ses" technique is indicated with the "EL" in old Turkic script in Orkhon notation, while an "L" sound played in the "gırtlak" technique is indicated with the script "AL".

The partnership and harmony of musicology and linguistics between the physical structure of the instrument and the old Turkic scripts used to write its notation is the most basic factor in associating Orkhon tamghas with the mouth harp notation system. Historically, the use of alphabets to write musical notes is actually common and not a new phenomenon today. So much so that Dmitri Kantemiroğlu, who lived between 1673 and 1723 during the Ottoman Empire period, was inspired by the "Abced" notation system, produced works in many maqams and recorded them with the new writing system he developed. Likewise, in China, there is a system known as "Dunhuang" notes. Likewise, in China, there is a system known as "Dunhuang" notes. This system is also associated with the Chinese alphabet.

An experimental study was conducted to measure the effectiveness of the musical values of the symbols used in the created Orkhon tamgha notation. In this study, the meaning and musical values of tamghas in mouth harp notation were taught to the subject. Accordingly, the subject was asked to read and perform tamghas in question musically. At the end of the eighth lesson, posttest and permanence tests were applied

and positive results were obtained from the experiment to a large extent. The experimental tests were evaluated by five participating referees and statistical analyzes of the results were made.

On the other hand, when the scores of the participants were examined, it was observed that there was a decrease in the permanence test compared to the posttest study. In "Table 1", it is observed that this decrease is found in the execution of the **E2, C4** and **E5** tamgha combinations in the question groups. When this issue was evaluated, it was determined that the technical reasons for the falls were that some of the scripts were not visually remembered correctly by the subject.

Decreasing Tamgha Combinations and Names Detected

E2: 𐰴𐰃 (AK/AL)

C4: 𐰇𐰃 (ES/AL)

E5: 𐰋𐰉𐰍 (EK/EL/EY)

Some tamghas in the Orkhon alphabet are derived from each other. Accordingly, there are various visual similarities between these tamghas. For example, some tamghas have been turned into new tamghas by overturning only to the right, some by turning them up and down, some by turning them like a mirror reflection, and some by adding to their surroundings or to themselves.

Examples:

a. 𐰴 (AK) 𐰺 (ET) 𐰼 (AR)

b. 𐰸 (EV) 𐰾 (EM)

c. 𐰚 (AÇ) 𐰉 (EL) 𐰍 (İÇ)

d. 𐰽 (ANÇ) 𐰾 (AD)

Considering these examples, it can be deduced that the subject confuses some tamghas with others. Because the tamgha **"AK"** (𐰴), in **E2** can be confused with other similar tamghas mentioned in the examples. In this context, when the test phase was examined, it was determined that it was confused with the tamgha **"ET"** (𐰺). Likewise, the tamgha in the **"C4"** combination (𐰇/𐰃**,** ES/AL) have similarities between each other. In the **"E5"** question, a triple combination is seen. Here, when the experimental process is

examined in more detail, it is observed that the tamgha **"EL"** (𐰴), in the middle was pronounced correctly in the posttest study, but an error was made in the permanence test. However, as indicated in the table, it is not a visual confusion, but a deviation arising from the incorrect expression of the thinness and thickness of the tamgha, while it is correct to give the **"L"** sound. Accordingly, the musical value of the tamgha **"AL"** was performed instead of the tamgha **"EL"**.

Most of the tamghas used in orhon notation are performed by playing the sound of the letter given by the tamgha on the mouth harp. For example, the tamgha **"ET"** sounds like a breathy **"T"**. Therefore, since the letter is pronounced exactly, using a different tamgha instead of **"ET"** does not seem logical as it would create a technical contradiction. Therefore, in order to eliminate similar confusions that occur within this framework, it is recommended that the student learn the old Turkic script (Göktürk alphabet), independently of their musical values, over a longer time than the experimental period, carefully and through practice, at the stage of learning Orkhon tamgha notation.

Likewise, the readings of the symbols used in a work written in Orkhon tamgha notation should be repeated and practiced many times, just as every musical piece is performed.

On the other hand, it has been observed that tamghas that do not correspond to a letter sound like ök/ 𐰽, ag/ 𐰃, ok/ 𐰆, as/ 𐰇, were not confused in experimental studies and test studies, and that no mistakes were made in the execution of these tamghas.

5. Conclusion and Suggestions

5.1. Conclusions

- It was concluded that the notation systems written using a single stave should be moved away from and more inclusive methods should be used.
- It has been determined that symbols that can indicate the breath, vocal, special timbre effects and rhythmic differences of the mouth harp should be developed.
- It has been concluded that notation can be made using the alphabet, as there are examples in history.
- It has been determined that the notation systems developed using the alphabet should be compatible with the characteristics of the mouth harp.
- It has been determined that having the symbol values of the alphabet in question is more useful in reading musical notes.
- Due to the nature of the instrument, its technical connection with linguistics has been determined and the importance of the chosen alphabet being compatible with the mouth harp, both musically and linguistically, has been emphasized.

- It has been concluded that the "kök ses" and "gırtlak" techniques in the basic playing of the mouth harp show parallelism/equality with the thinness-thickness principle in the Orkhon alphabet.
- • Since the special sounds obtained from the instrument are formed by the pronunciation of the letters, it has been determined that the Orkhon alphabet is suitable for symbolizing them.
- It has been determined that Orkhon tamgas are easier to perceive, as they are separated from the Latin letters used in general musical notes and look more like symbols.
- Tamghas, which symbolize some mouth harp sounds, have been determined as the first tamgha/letter of the techniques found in Orkhon notation.
- It has been determined that tamghas can be categorized among themselves and tamghas derived from letter pronunciation and tamghas that do not have any letter sound value can be separated from each other.
- It has been concluded that the use of the Orkhon alphabet in the mouth harp notation has common aspects both historically and culturally.
- It has been concluded that the representation of the original tones obtained from the mouth harp is more inclusive with tamghas.
- According to the results of experimental studies, it has been determined that the subject's effectiveness in learning is at a high rate.
- It is seen that the location in which the tamghas are written in the notation system do not create musical reading difficulties.
- It has been determined that some tamghas can be confused with their similar ones.

5.2. Suggestions

- Before working on the tamgha notation system developed for mouth harp, it is necessary to learn the Orkhon alphabet and spelling rules.
- It is predicted that the margin of error will decrease as a result of testing the subjects over a longer period of time.
- The necessity of a generally accepted notation system for the mouth harp is of primary importance in order to produce written works and to create sources.
- The learning process should be carried out by separating the groups of tamghas, their distinguishing points from each other, their letter values, and the functions of those without letter value from each other.

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APPENDIX: Some sample classes

Lesson 1

Duration: 40 minutes

Topics: The historical origin of the old Turkic scripts, the writing techniques of Orkhon notation, the introduction of experimental musical compositions, the introduction of tamghas to be used in the experiment.

Achievements:

- Information about the content of the experiment is obtained.
- The functioning of Orkhon tamgha notation is learned in general terms.
- The subject is prepared to read and learn tamghas.
- Have general information about experimental compositions.
- Historical information about the origin of the old Turkic scripts are obtained.

Methods and Techniques: Demonstration, presentation and discussion.

Activities: Explaining the general lines of the Orkhon tamgha notation system with examples and introducing the basic sounds.

Explanations: Old Turkic Orkhon tamghas and historical and linguistic information about Turkish language of that period is learned. The similarities and differences between the letters are revealed. The subject is informed about the origins of tamghas. General information is given to learn the Orkhon notation system. Experimental compositions are examined and exemplified.

Lesson Content

Introduction: First of all, the working method of the mouth harp is explained based on the related images. Here, the subject's mouth harp playing knowledge is refreshed with various graphics and diagrams. In general, the importance of creating timbral differences with letters is conveyed. In addition, by emphasizing which of these letters are more functional than the others, the subject is prepared for the next stages in understanding the musical values of tamghas.

Turkic Petroglyphs: The subject is introduced to Turkic petroglyphs (rock drawings, rock art) before seeing sections from old Turkic Orkhon inscriptions. The aim here is to have information about the origins of tamghas and to make it easier to recognize them visually.

For the aforementioned petroglyphs, images based on photographic works that are directly included in Servet Somuncuoğlu's book *"From Siberia to Anatolia the Turks on The Rock"* are used. The stylistic features and diversity of the petroglyphs in these

images are mentioned. In Somuncuoğlu's work, the map published to indicate the regions where he made photographic studies and made observations is shared with the subject. Thus, the subject is introduced to the Central Asian Turkish geography and culture and the Orkhon Valley region of Mongolia where the Bilge Kagan, Kül Tigin and Tonyuyuk monuments are located.

Orkhon Inscriptions: In the first stage, information is given about the period when Orkhon monuments were erected and the Turkic Khaganate and its historical process. The images of the inscriptions are shared with the subject and informed about their content. The inscriptions on the Orkhon monuments are shown, their ties with the petroglyphs are discussed, and the origins of some tamghas are indicated. Some spelling rules are explained with sample words and the logical infrastructure necessary for the subject to be able to read tamghas is prepared. Especially, detailed information was given by emphasizing some of the tamghas.

Writing System: With the example of Austrian composer Johann Georg Albrechtsberger's concerto in D Major, some contradictions and inadequacies in his mouth harp notation are scrutinized and discussed. The technical details of Orkhon tamgha notation are explained to the subject and reading practices are made. Tamghas used in experimental compositions are explained one by one and their musical values are taught.

Concluding the Lesson: Different techniques of playing the mouth harp are discussed and their spelling in the Orkhon notation system is discussed. Some tamgha images are given as homework for the subject to prepare for the next lessons. The type of mouth harp to be used during the experiment is determined precisely. The subject acquires all the information about Turkish culture, writing and Orkhon tamgha notation, which will form the basis for the experiment.

Lesson 2

Duration: 40 minutes

Subjects: Subjects: Performing I and II experimental compositions, introducing auxiliary tamghas (af/𐰀-𐰅, ok/↓) doing notation reading exercises.

Achievements:

- The subject gets acquainted with the Orkhon notation system practically.
- The learning process is reinforced with reading exercises.
- I and II experimental compositions are learned.
- Auxiliary tamghas of notation and their functions are learned.

Methods and Techniques: Demonstration, presentation and discussion.

Activities: Reading and performing experimental compositions numbered I and II together and in mutual consultation.

Explanations: Reading practice of Orkhon tamgha notation system was conducted. It is ensured that the subject fully understands and adopts the system. Preparations are made for the timbre structure of tamghas, which will be focused on in the following lessons. All technical questions of the subject about the notation system are answered.

Lesson Content

Introduction: The subject is told about two experimental compositions and the tamghas used in them.

I Experimental Composition: First of all, the stamps used in the I. Experimental work are examined. Then it is performed and practiced for a while. Then, the melodic structure and rhythm patterns of the music are examined. The points and elements that the subject should pay attention to are highlighted. In the next stage, the written music is performed by focusing on the details, and seven of the stamps used in the experiment are learned and evaluated by practice. These are **ök/**𐰺**、ag/**𐰀**、as/**𐰋**、af/**𐰃**-**𐰆**、ok/**𐰲 ve **ey/**𐰾 tamghas.

II Experimental Composition: At this stage, the tamghas used in the II experimental composition are examined. There are two more new tamghas here, apart from the ones in the first work. These are the **el/**𐰴 ve **al/**𐰇 tamghas. The process basically progresses and develops just as in the first experimental composition.

Concluding the Lesson: The information learned is provided. In order to better understand the differences between the thinness and thickness of the tamghas, information about Turkish language vowel harmony was given.
