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THE EFFECT OF MOBILE DISTANCE EDUCATION METHOD USED IN EXTRACURRICULAR EAR TRAINING ON STUDENTS' ACHIEVEMENT LEVELS

Ahmet Suat Karahan *

[a] *Pamukkale Üniversitesi, Müzik Eğitimi Anabilim Dalı, Denizli and 20160, Türkiye*

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Abstract

The Mobile Distance Education method adds a great flexibility to the education-teaching process by almost completely destroying the boundaries of time and place. Thus, the method allows the student-teacher interaction to continue in and out of school. The aim of the research is to determine the usability of this effective method in Ear Training extracurricular study processes of students at Music Education Undergraduate Program and the effect of the method on the achievement scores of the students. In the study, in which the experimental method was used, the post-test achievement scores of the experimental group who did their extracurricular Ear Training studies with the Mobile Distance Education Method and the control group students who did their extracurricular Ear Training studies with the traditional method were compared. As a result of the research, it was determined that there was no significant difference between post-test success levels of the experimental groups and those of control groups regarding the theoretical and practical interval, theoretical chord and rhythmic dictation but there was a significant difference between the practical chord and melodic dictation achievement scores in favor of the experimental group. However, when the raw achievement scores of the two groups were compared, it was seen that the experimental group increased both in-group and inter-group success levels more in each of the 6 criteria, that is, it was more successful than the control group. Based on the findings and results of the research, it can be said that students' extracurricular Ear Training study processes can be organized with the mobile distance education method and the method has increased the success levels of the students.

Keywords: Distance Music Education, Distance Mobile Music Education, Ear Training, Ear Training and Extracurricilar Study Methods

*Ahmet Suat KARAHAN. ORCID ID.: https://orcid.org/0000-0001-7494-4678
E-mail: ahmetsuatkarahan@outlook.com

1. Introduction

In modern educational approaches, the learning process is seen as a whole, and for this reason, technological opportunities are used in order to plan the curricular and extracurricular learning environments by associating them or to supervise self-regulation in a reinforcing way. In this approach, which makes the education-teaching process more dynamic and effective, interactive applications, synchronous and asynchronous distance education-teaching applications are frequently preferred methods.

In music education, it is seen that the distance education method is frequently used at music departments of various universities, it is compared with the face-to-face (traditional) method in scientific research, and the effectiveness, reliability and applicability of the method are intensively examined (Bennett, 2010; Lockett, 2010). It is noteworthy that in these studies, the effectiveness of the method is usually measured (regardless of synchronous or asynchronous) in the context of private platforms (Shepard, 2000) or commercial video conferencing applications (Shoemaker & van Stam, 2010). However, although mobile communication technology is widely used both in social life and in the educational process, the effect of mobile distance education method on musical success has not been tested yet.

This technology, which can act with the individual and is widely used by almost all age groups, is used for a wide variety of purposes changing from social life to commerce and education, due to its advantages such as facilitating access to information and sharing information and providing freedom of movement. The widespread use of mobile devices has led to the emergence of new methods and approaches in learning processes and services (de Waard, 2013). Although it was theoretically stated in the 1970s that learning can take place outside the classroom, these approaches basically talk about the mobilization of learning. (Sharples, Taylor, & Vavoula, 2005).

Today, mobile devices are widely used in both music listening activities and theoretical and practical music studies and practices processes. The methods used in the integration of distance education into music education show parallelism with technological and sociological tools. On the other hand, in terms of educational technologies, music education is particularly concerned with the implementation phase of distance education. The methods used in the integration of distance education into music education show parallelism with technological and sociological tools. For example, while in 1932 it was an American radio program for string students (Wassell, 1965; Cooper, 2005), today commercial video programs (Shoemaker & van Stam, 2010; Shirky, 2009) and virtual classrooms are used and even today's most important video sharing platforms have become asynchronous distance music education portals (Kruse & Veblen, 2012). However, it is seen that the online distance education studies focus on just the applicability, which is a certain point, and it is understood that the reported studies are tuned in the obstacles in front of this applicability. It can be said that the fact that music pedagogy has a conservative nature (the tendency to teach as we were taught) played a role in this situation.For example, Dammers (2009) reported that when online education is compared with traditional education, the teacher should have a more planned approach in the online environment, which affects the communication and interaction between the student and the teacher. Similarly, pre-school music teachers who teach in Finland Integrated Digital Network system have stated that every step of

the lesson should be planned by them and have added that this is against the improvised nature of education. (Maki,2001).

In addition to pedagogical obstacles, hardware and technical obstacles in music education technology constitute another aspect of the literature. For example, Dammers (2009) reported that camera angles are a problem in asynchronous and synchronous studies as they prevent the effectiveness of factors such as eye-eye contact and posture. Shoemaker and van Stam reported that the most important problem in synchronous education was addiction to internet connection, latency and synchronization disorder between video and audio in their comprehensive e-piano lessons including synchronous and asynchronous approaches in 2010. However, as can be seen from the studies mentioned above, these studies did not consider important factors such as access to technology, prevalence and economics of education in the concept of distance education in music. In addition, when the literature was examined, no study was found in which the arrangement of the students' extracurricular study processes of the mobile distance education method and the effect of the method on the success levels of the students (success, memory, etc.) were examined.

It can be argued that there is a linear and two-way relationship between the musical learning and thus cognitive dynamics of musical success and the physical environments in which this learning takes place. In the cognitive dimension axis, the source of musical learning has been stated as the musical training process accompanied by a teacher and the practice process performed by the learner on his own (Johnston & Kraus, 2013), and these activities reinforce cognitive processes such as motor abilities (Costa-Giomi, 2005), memory (Hansen, Wallentin, & Kraus, 2013) and success. Although the basic dimension of both processes is statistical learning in music (Huron, 2006), it continues to be discussed how much of the outputs of this process is the learned information and how much is the phylogeny of the genre. However, it has been demonstrated that the majority of sensory experience and learning occurs as a result of passive (unsupervised) or actively (supervised) exposure to the environment. In addition, there are two physical environments in which active musical learning (in which theoretical and practical dimensions run simultaneously) mostly takes place. The first of these is the learning environment which takes place in the formal environment and is accompanied by the teacher (Musical Training), while the other is the environment where the learner carries out his personal studies (Practicing), which takes place in the informal environment. Since active learning environments accompanied by teachers are guided, learning and success, as a result, show relative differences. However, extracurricular learning environments cannot be as effective as active learning environments due to both the lack of guides in learning and the active environmental distractors. Therefore, organizing extracurricular study processes by the teacher as much as possible and using educational technologies attract attention as an effective solution for increasing musical success.

1.1. Aims and Research Questions

It is aimed to explore how the regulation of extracurricular learning environments through mobile communication could change the ear training achievement scores of participants. Furthermore, it is also desired to show whether mobile communication apps could be useful and

applicaple onto distance music education processes. Accordingly, in this exploratory study, the underlying research questions were the following:

1.1. Problem

Is there a significant difference between the post-test scores of the experimental group who did their extracurricular Ear Training studies with the mobile distance education method and those of the control groups who did their studies with the traditional method?

1.2.1. Sub-problems

1.2.1.1. Is there a significant difference between the theoretical interval-chord questions post-test scores of the experimental and control groups depending on the method variable applied during the Ear Training extracurricular study process?

1.2.1.2. Depending on the method variable applied in the Ear Training extracurricular study process, is there a significant difference between the theoretical -practical interval-chord questions post-test scores of the experimental and control groups?

1.2.1.3. Is there a significant difference between the experimental and control groups' rhythm dictation writing post-test scores depending on the method variable applied during the Ear Training extracurricular study process?

1.2.1.4. Is there a significant difference between the melody dictation writing post-test scores of the experimental and control groups, depending on the method variable applied during the Ear Training extracurricular study process?

2. Method and Experimental Design

Experimental and control groups consisted of Music Education Undergraduate Program students. In the research, experimental and control groups were selected as a result of elimination from a total of 92 students, whose success levels in theoretical interval, chord, practical interval, chord and rhythmical dictation and melodic dictation were equivalent to each other. In this elimination, the pre-test described in full below was used. As a result of the preliminary evaluation, an experimental group consisting of 30 students and a control group consisting of 30 students were formed. In other words, 32 students were excluded from the study in the forming of the groups. Thus, an equivalent experimental and control group was formed in the general total and in each of the 6 criteria.

After the groups were formed, the experimental group did their extracurricular Ear Training activities with the Mobile Distance Education Method and the control group with the traditional method. Extracurricular study of the students in two groups was limited to 3 days a week for 4 weeks and daily working time was limited to 40 minutes. In other words, the extracurricular Ear

Training study times of the experimental and control groups were equalized. The effect of the methods on the success level of the students within the scope of 6 criteria was measured with this experimental environment in which the success levels and study times of the groups were equalized. The pre-test and post-test data of the experimental and control groups were evaluated by hierarchical linear modeling using the SPSS 22 program.

2.1. Mobile Communication Technology Enviroment

Within the scope of the research, the "WhatsApp" program was preferred in the implementation of the Mobile Distance Education Method because the program is widely used in Turkey, all of the students in the study use the program effectively, it is free, pictures, audio documents in various formats and video recordings can be shared without any problems with the program, and this program works smoothly on all smart phones.

In the study, the students used their smart phones with different brands and features. Using gsm and wireless internet, students did their extracurricular work at various places such as home, school, and park. In the research, the teacher used an Iphone 8 plus and shared the theoretical interval, chord, rhythm and melody dictation questions and answer keys in pdf format with the photo or ScannerOCR application. When Figure 1 is examined (shown with the arrow on the left), various features of the program can be seen. Audio recording files (shown with the arrow on the right) were sent for applied interval, chord, rhythm dictation and melody dictation studies.

Figure 1. Features of the "WhatsApp" Program used in Mobile Distance Education

2.2. Ear Training Concept and Materials

It is aimed to provide students with the most basic knowledge and skills related to professional music education. Extracurricular Ear Training activities, which were carried out with the mobile distance education method, were carried out 3 days a week. In each study, 10 theoretical and practical interval and chord studies, 1 rhythm dictation and 1 melody dictation were carried out. Samples of theoretical interval and chord studies are presented in figure 2 and 3.

Theoretical interval studies Answer key

Figure 2. Screenshot of Theoretical Interval Studies Sent via "WhatsApp"

In Figure 2, two sample screenshots of the theoretical interval question and answer key are presented. In these studies, students were asked 10 questions and approximately 8 minutes were given to answer these questions. Students were asked to examine their correct and incorrect answers by checking the answer key.

Theoretical interval studies Answer key

Figure 3. The Screenshot of Theoretical Chord Studies Sent via “WhatsApp”

Figure 3 shows an example of theoretical chord questions. In these studies, students were asked 10 questions and approximately 8 minutes were given to answer these questions. The answer key to the questions is shown in figure 5. Finally, the students were asked to examine their correct and incorrect answers during the study process.

In pratical interval studies, each interval question was sent to the students as a voice recording. In these recordings, each of which lasted an average of 32 seconds, first the sound la was sounded and then the two sounds forming the interval were played simultaneously (simultaneously). Before the recording was interrupted, the sound la was played again and the

same interval was given for the second time, and at the end of the recording, the names of the notes forming the interval were said first as a deep sound and then as a low sound, and the recording was finished. Each interval study was created with this method. The sample of sound recording of the method is presented in figure 4. These audio files were created with the microphone cursor indicated by the right arrow.

Figure 4. Screenshot of Practical Interval and chord Study Audio Recording Sent via "WhatsApp"

In practical interval studies, each interval question was sent to the students as a sound recording with the method in figure 4. In these recordings, each of which lasts for an average of 32 seconds, first the sound of la (440hz) is given, and then the two sounds that make up the interval are played at the same time. Before the recording was interrupted, the sound of la was played again and the same interval was given for the second time, and at the end of the recording, the names of the notes forming the interval were uttered as deep, and low tones, respectively, and the recording was finished. Each practical interval and chord study was done with this method.

2.3. Rhytmic ve Melodic Dictation Studies

In the rhythmic dictation and melodic dictation studies, while the questions were sent as audio files, the answers were sent as documents. In each study, the students were asked 1 rhythm dictation consisting of 8 measures (meters). Firstly, the 1^{st} and 2^{nd} measures were played so that they could understand the method of rhythm. After about 60 seconds, the students were asked to listen to this recording again. After 60 seconds, the 3^{rd} and 4^{th} measures of the rhythm were played. After 60 seconds, the students were asked to listen to this recording again. Rhythm dictation study consisting of 8 measures was applied with this method. Finally, the students were asked to examine their correct and incorrect answers.

Rhythmic Dicatation Study Answer key

Figure 5. Screenshot of Rhythmic Dictation Audio Recording and Answer Key Sent via "WhatsApp"

The melody dictation questions and answers were sent using the method in figures 5 and 6. In the study of melody dictation, firstly, the sound of la was given and the whole melody (8 measures) was played so that the students could understand the tone / mode and tempo/method of the melody. Afterwards, the students were given 60 seconds of time and the 1st and 2nd measures of the melody were played and waited for another 60 seconds. Then, the 1st and 2nd measures were played and the 3rd and 4th measures were played and after 60 seconds, the 3rd and 4th measures were played again. With this method, a melody dictation study consisting of 8 measures was applied. Afterwards, the entire melody was played to the students and 60 seconds were given to check all the melody dictations. Then, the 1st and 2nd measures were played and the 3rd and 4th measures were played and after 60 seconds, the 3rd and 4th measures were played again. With this method, a melody dictation study consisting of 8 measures was applied. Afterwards, the entire melody was played to the students and they were given 60 seconds to check all the melody dictations. Finally, the answer key of the melody dictation was sent to the students and they were asked to examine their correct and incorrect answers.

2.4. Data Collection and Evaluation

The research data were obtained with the literature review method and the created experimental environment. Experimental environment data were collected with pretest-posttest exams applied to the experimental and control groups and measuring 6 criteria in total. The pretest-posttest evaluations of the groups were conducted by three field experts. The questions within the scope of a total of 6 criteria are shown in table 1, and the evaluation scores of the tests are shown in table 2. A mixed design was employed in this study. In order to interpret applied and theoretical achievement scores, we analysed and introduced in acccording to this approach. We then employed a hierarchical linear modelling procedure in order to test for significant effects on these theoretical and applied achievement score factors via using the *Mixed*

procedure in SPSS. All estimations are based on restricted maximum likelihood with Compound Symmetry covariance structure (which produced overall the best AIC fit indices).

Table 1. Questions Formed within the Scope of 6 Criteria in the Pretest-Posttest Exam

Questions Consisting of 6 Criteria	Questions
Theoretical Interval	m2, M2, m3, M3, P4, A4, E5, T5, m6, M6, m7, M7
Applied Interval	m2, M2, m3, M3, P4, A4, E5, T5, m6, M6, m7, M7
Theoretical Triad	M, M6, M4-6, m, m6, m4-6, M+5, m-5
Applied Triad	M, M6, M4-6, m, m6, m4-6, M+5, m-5
Rhythm Dictation	Rhythm dictation question consisting of 8 measures in 7/8 measure
Melody Dictation	Melody dictation question in 5/8 measure consisting of 8 measures in Huseyni maqam adapted to 12 Equal Tampere System

As seen in Table 2, the weighted loads of the achievement score components in the total achievement score were shared considering the difficulty of each component in auditory performance. In addition, the curriculum rules that the students are subject to were also taken into account.

Table 2. Score Evaluation table

Evaluation	Score per Question	Number per Question and Meter	Total Score
Theoretical Interval	1,0416 puan	12	12,5 puan
Applied Interval	1,0416 puan	12	12,5 puan
Theoretical Triad	1,115 puan	8	12,5 puan
Applied Triad	1,115 puan	8	12,5 puan
Rhythm Dictation	3,125 puan	8	25 puan
Melody Dictation	3,125 puan	8	25 puan
		Grand Total	**100 puan**

3. Findings and Comments

Findings related to the problem statement of the research were presented by determining the differences between the pre-test and post-test success levels of the experimental and control group students.

Figure 6 presents the mean intensity of the theoretical interval achievement scores separated by time and groups. According to our hierarchical modelling only time factor ($F(1,87)=22.16$, $p=<.01$) was significant indicating that the theoretical interval achievement scores increased from pre to post experiment.

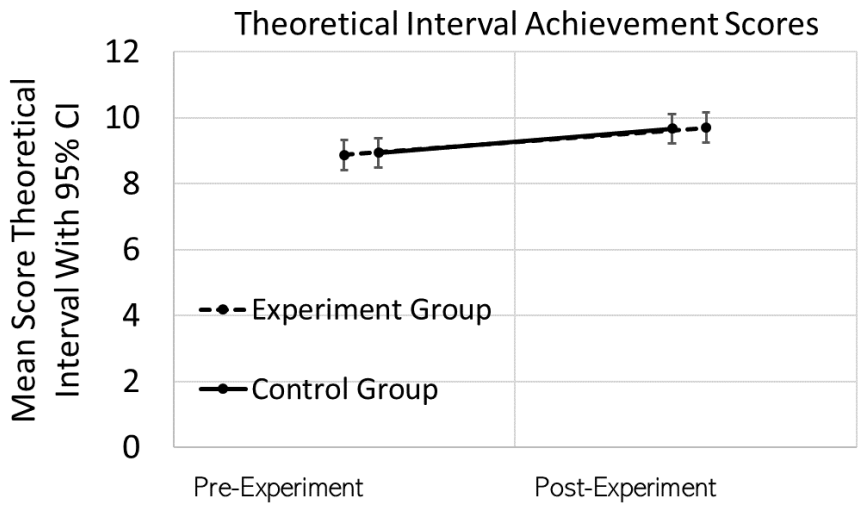

Figure 6: Mean intensity of Theoretical Interval Achievement Scores separated by time and groups.

Figure 7 presents the mean intensity of the applied interval achievement scores separated by time and groups. According to the results, the time factor ($F(1,87)=20.17$, $p=<.01$), the group factor ($F(1,87)=6.90$, $p=<.01$) and the interaction between time and group ($F(1,87)=9.83$, $p=<.01$) were significant. When the graph is examined, it indicates that while the experiment group's applied interval achievement scores increased from pre to post experiment, the control group remained steady from pre to post experiment.

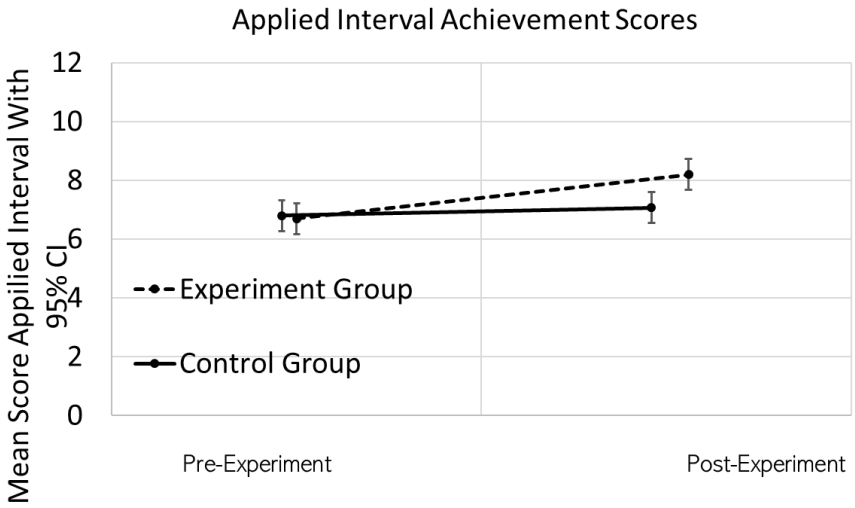

Figure 7. Mean intensity of Applied Interval Achievement Scores separated by time and groups.

Figure 8 presents the mean intensity of theoretical triad achievement scores of groups' from pre-to post experiment. According to our hierarchical modelling, only the time factor ($F(1,87)=20.79$, $p=<.01$) was significant which indicates a change through time. In according to graph both groups' achievement scores positively higher when compared with their pre-experiment scores.

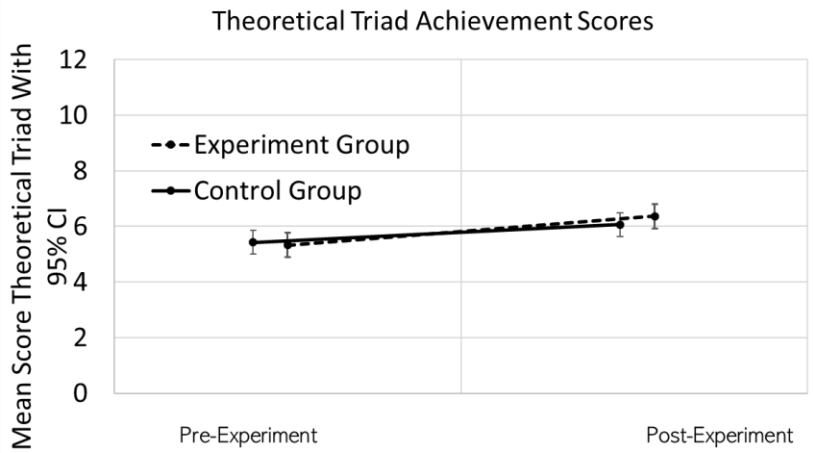

Figure 8. Mean intensity of Theoretical Triad Achievement Scores separated by time and groups.

For the mean intensity of applied interval (Figure 9), the time (F(1,87)=31.53, p=<.01), the groups (F(1,87)=15.45, p=<.01) and the interaction between time and groups (F(1,87)=12.65, p=<.01) were significant. According to results, while the achievement success of experiment group increased from pre to post the control group success rate remained steady.

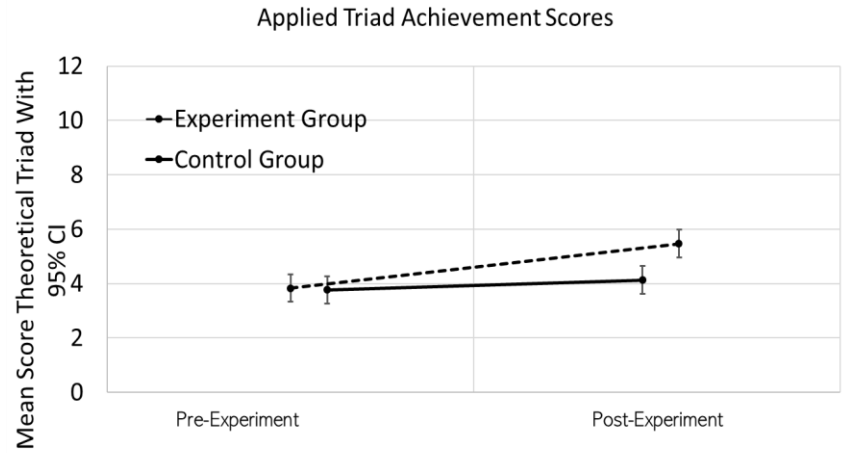

Figure 9. Mean intensity of Applied Triad Achievement Scores separated by time and groups.

Figure 10 presents the mean intensity of rhythm achievement scores from pre to post experiment. In according to results, only the time factor (F (1,87)=7.23, *p*=<.01) was significant. The graph indicates that both groups' rhythm achievement scores increased from pre to post experiment.

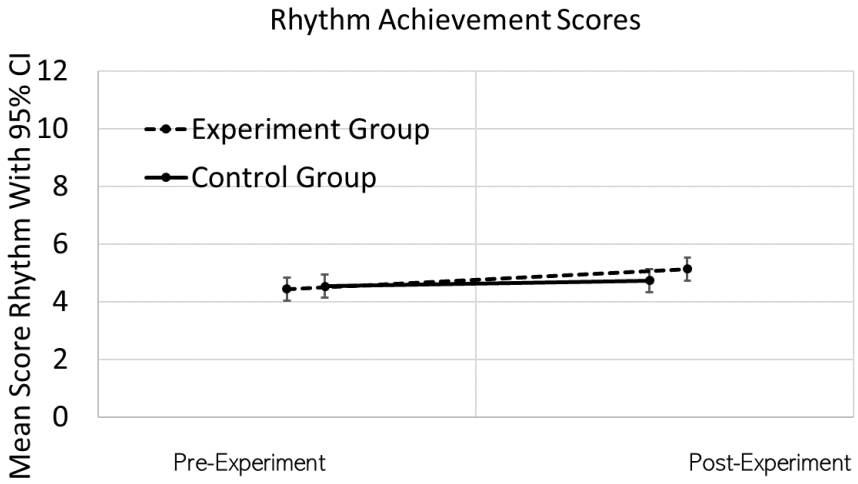

Figure 10. Mean intensity of Rhythm Achievement Scores separated by time and groups.

Figure 11 presents the mean intensity of melodics achievement scores from pre to post experiment. In according to our hierarchical modelling, the time (F (1,87)=4.45, *p*=<.05) and the group (F(1,87)=3.77, *p*=<.05) main factors were significant. When the graph examined, while the experiment group's achievement scores increased from pre to post, the control group's scores remained steady.

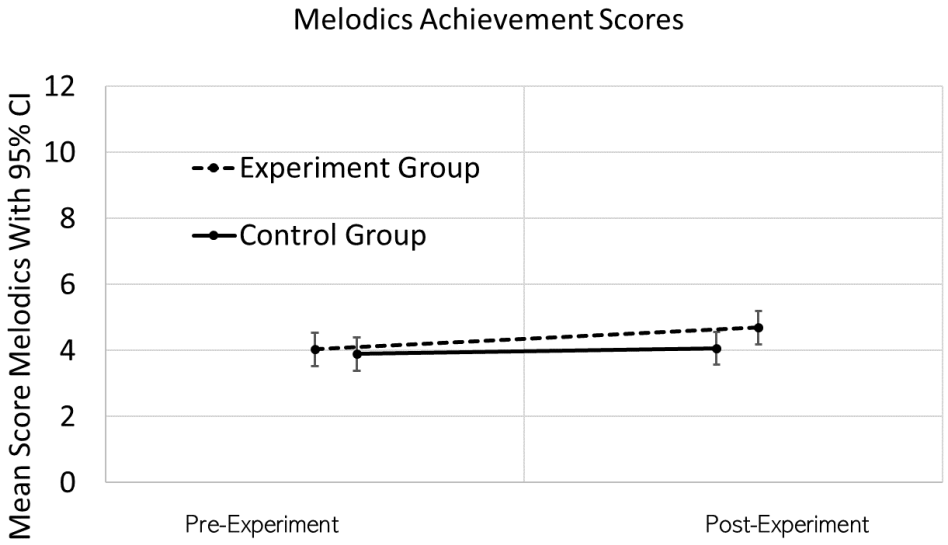

Figure 11. Mean intensity of Melodic Achievement Scores separated by time and groups.

Table 3. Pretest-Posttest Achievement Scores and Difference of Progress Level of Experimental and Control Groups

	Experiment Group				**Control Group**		
Evaluation criteria	***Pre-Ex.***	***Post-Ex.***	**Progress**	**Difference**	**Progress**	***Post-Ex.***	***Pre-Ex.***
	Puan	**Puan**	**Puan**		**Puan**	**Puan**	***Puan***
Theoretical Interval	9,22	10,10	0,88	***0,12***	0,76	10,06	9,3
Applied Interval	6,97	8,54	1,57	**1,30**	0,27	7,35	7,08
Theoretical Triad	5,94	7,09	1,15	***0,45***	0,70	6,75	6,05
Applied Triad	4,27	6,08	1,81	**1,4**	0,41	4,6	4,19
Rhythm Dictation	13,84	16,03	2,19	**1,47**	0,72	14,87	14,15
Melody Dictation	12,59	14,68	2,09	**1,59**	0,5	12,68	12,18
Grand Total	**52,83**	**62,52**	**9,69**	**6,33**	**3,36**	**56,31**	**52,95**

When Table 3 is examined, it is seen that the pre-test-post-test scores of the experimental and control groups, their intra-group developments and the differences in achievement levels between the groups. When the achievement scores of the groups are examined, it is seen that the experimental group has improved more than the control group, especially in practical interval-chord and rhythmic-melodic dictation. However, it is noteworthy that there was a difference in favor of the experimental group in the theoretical interval-chord studies, but this difference remained at a low level. When Table 9 is examined, it is noteworthy that the experimental group was more successful than the control group in each of the 6 criteria, but this difference increased in practice-based studies.

4. Results

In the research, the difference in achievement scores between the theoretical and practical interval-chord, practical rhtyhm and melody dictation post-test scores of the experimental group students who did their extracurricular Ear Training studies with the Mobile Distance Education Method and the control group students who did it with the traditional method were examined.

As a result of the research, it was determined that there was no significant difference between the theoretical and practical interval, theoretical chord and rhythmic dictation post-test success levels of the experimental and control groups, but there was a significant difference between the practical chord and melody dictation success levels in favor of the experimental group. However, when the raw achievement scores of the two groups are compared, it is seen that the experimental group increased both in-group and inter-group success levels more in each of the 6 criteria, that is, it was more successful than the control group. In the light of all the data, it can be said that students' extracurricular Ear Training studies can be organized with the mobile distance education method and the method contributes positively to the achievement levels of the students.

5. Discussion

The frequency of practice and the importance of deliberate practice play a critical role in acquiring musical behavior, as well as the influence of both the environment and the individuals who would play a key role in this learning (Hallam and Lamont, 2004). Schellenberg (2012) stated that formal training and practice not only improve performance, composition, direction, and other practical music activities, but also have a positive contribution to listening skills (Gaser and Schlaug, 2003). For example, Ericsson, Krampe, and Tesch-Romer (1993) stated that the overall success among the best and good violin students was determined by the total study time. The sensory achievement of the experimental group before the application showed a significant difference with the post-experimental achievement scores. From this point of view, it can be said that increasing the total practice time (accumulated practice) by arranging the extracurricular environment directly affects sensory success. In addition, the experimental group showed a significant positive difference from the control group in the practical area. It can be assumed that this situation is also a result of statistical learning. However, this effect was not observed in rhythm, which is another practical field. Therefore, it can be said that statistical learning has a more direct positive effect on pitch size than sensory learning in this study. In addition, the result that the arrangement of general working times is not effective in practicing or using the theoretical knowledge is reported as another output of this study.

The integration of information and communication technologies into music education requires an approach that requires both the framing of the desired behavior and the adaptation of technological applications compatible with this framework. Puentedura (2006) states that this process should be done by/with using alternative technological tools (Substitution), the one-to-one participation of students and expanding their practice habits (Augmentation), the student's

feedback from friends or teachers via audio or video recordings (Modification), and the student's simultaneous participation to the practice and critique sessions via online platforms (redefinition). From this point of view, this study is fully compatible with the concept described above in terms of applicability, as the student is trained with alternative technological tools, learning is expanded, and the students can receive feedback. However, considering that the technological literature in music education is clustered as the usage of classroom technological instruments and it is more focused on expanding classroom learning, this study presents an alternative approach in terms of applicability.

Cultural dissonance between the learner, the teacher and the environment and the problem of access to resources play a dominant role among the obstacles to the active accessibility of music education (Sloboda, 2001; Hargreaves et al., 2003). Therefore, employing technological elements stands out as a very effective solution in minimizing the existing cultural dissonance between the instructor and the teacher. In addition, documenting the cognitive and behavioral outputs that these technological adaptations will create in music learning is very essential in terms of applicability and for future-looking. In addition, the fact that these educational technology applications are accessible to everyone (educational economy) is an undoubted fact that will be very effective in achieving qualified outputs.

This study showed that the use of mobile technology in music education not only reinforced sensory-musical learning in an economical way, but also indirectly revealed significant differences in minimizing cultural dissonance between students and teachers. Nevertheless, the study presented here, to our best knowledge, is the first to show that mobile technologies are effective in musical learning.

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