



THE EFFECT OF MUSIC ASSISTED INSTRUCTION ON EXAM SCORES FROM TRIANGLES IN GEOMETRY LESSON

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ABSTRACT

In this study, the effect music assisted instruction on students' exam scores taken from triangle subject was investigated. The research was made with 177 of the freshmen from 4 different classes in Buca Faculty of Education, and the department of Elementary Mathematics Teaching in 2011-2012 in fall semester. In this study, experimental model with pre-and post-test control group was used. For this purpose, two experimental and two control group were formed. Music assisted instruction by making one of the experimental groups listen to Classical Music and one listen to Turkish Art Music just before presenting the triangles in geometry class during five weeks and non assisted instruction were applied to the control groups in presenting triangles in geometry lesson. "The achievement test of triangles" was used as data collection tool. As a result of the research, it was determined that music assisted instruction was effective on student success in triangles comparing to traditional instruction; however, no significant difference was found between experimental groups listened to Classical and Turkish Art music.

Keywords: Geometry, triangles, music instruction, test score

1. Introduction

The twentieth and twenty-first centuries have an important role in many developments in science. Because it is a quite busy period when interdisciplinary studies took place (Yener, 2004). These centuries have made the formation of information society inevitable. This is the society which was driven by highly talented, well developed brains based on thought. Thus, the questions how the brain develops, what are the mechanisms that trigger it, why some brains are developed more, which skills develop the brain and create some structural differences and etc. have emerged. Naturally, the researches on this issue are made on the fields where special and different skills are used together and the people being active in these fields. Because the music is one of few activities using many functions of the brain together, it became many researchers' focus from the past to present in terms of perception in the brain, creation and interpretation (Zatorre, 2005). There are also different reasons of music's attracting such a great attraction, arousing curiosity, and being investigated. For example, making music includes evolutionary functions such as communication, group coordination and social cohesion. At the same time, it is a task launching nearly all mental functions of the brain such as perception, action, emotion, memory. That wealth made the music an ideal tool to investigate the brain's functioning (Ayata and Aşkın, 2008).

Music just like chess or mathematics is an endeavor requiring higher brain functions. These areas also lay the foundation of well developed "spatial" intelligence (Rauscher, 1993). Spatial intelligence is the skills of perceiving the visual world, creating images in the mind, and comprehending their differences (Boettcher and et al., 1994). Collating Geometry requiring the spatial intelligence whose relationship is maybe the strongest among the branches of mathematics with the music creating the basis of well developed spatial intelligence may give a different direction to mathematics teaching. Music may help



students in answering the questions correctly in geometry class by triggering the students' spatial intelligence, and facilitating their spatial thinking. Blending the music and geometry may turn them, whose basis are that similar to each other, into two pieces complementing a whole. World nations already believed educational role of the music, looked at and gave importance to it as an educational tool (Ayata and Aşkın, 2008). The results of several studies have revealed that there is a relationship between the fields of mathematics and music. They generally focus on the effect of the music on learning the concepts related to mathematics, mathematical thinking, and developing the judge (Göğüş, 2008).

According to Shaw (2003) music has positive effect on learning especially mathematical and some abstract concepts. In a study conducted in Australia in 1996, pre-school children were given music education for an hour per a week during 10 months. The effect of given education on math skills was examined. The children's math skills were evaluated via Test of Early Mathematics Ability. As a result, higher results were obtained from the group getting music education (Geoghegan and Mitchelmore, 1996). As it is seen, the studies made from the past to present provided a new perspective to the relationship between music and mathematics by showing the effect of music on mathematics. These studies, by shedding the following researches, may give a different direction to mathematics education; make the music sought-after item in mathematics education. In this study, by making the students listen to Classical and Turkish Art Music before presenting the triangles, it was tried to determine how the music affected the achievement of the students.

2. Method

In the study, quasi-experimental design with pretest-posttest experimental-control group was used. Experimental design was defined as research design used to discover the cause-effect relationship among the variables (Büyüköztürk, 2007). The aim of the quasi-experimental design is the same as experimental pattern's. The difference is selecting the experimental groups via measurements rather than by coincidence in semi experimental pattern (Ekiz, 2003; Karasar, 2006). In this study, non-random assignment in selecting the experiment and control groups, and being equal of the groups' pre-tests in terms of exam scores which is the dependent variable have been checked.

2.1. Data gathering and application

The research was made with 177 of the freshmen from 4 different classes in Buca Faculty of Education, and the department of Elementary Mathematics Teaching in 2011-2012 in fall semester. The study groups were divided into 4 groups as 2 experimental and 2 control groups. There are 89 students in experimental group, and 88 students in control group. 45 of 89 students in experimental group are in the group listening to Classical music, and 44 of them are in the group listening to Turkish Art music.

This study was carried out within a 5 week application by the researchers. The achievement test was given as a pre-test to examine if there was a significant difference between experimental and control groups before the application, in order to compare the achievements it was given as a post-test after the application. In the study, the traditional teaching methods were used in control group. The subject was presented traditionally, and drawn on the board with diagrams. The course was processed within lectures, asking question, and discussing. Operating time was same as in experimental group. In experimental group, music assisted instruction was used by making the students listen to Classical



Music in one group and Turkish Art Music in the other one for 15 minutes before presenting the triangles.

2.1.1. Data collecting tool and analysis

In the study, a 30 question "achievement test with triangles" was used as data collecting tool. The value of each question in the test was determined as 1. In this case, the highest possible score is 30. The achievement test was prepared from the questions in test books by the researchers. In order to ensure the reliability of the questions created with the necessary permission, the application made with 782 students and the reliability coefficient was found as .92. Correlation's being close to 1.00 means that the test is reliable (Tarman, 2002). The data obtained from the research was interpreted with "t" test analysis at 0.05 significance level. SPSS 15.0 (Statistical Package for the Social Science) on computer was used for this.

3. Findings

Table 1. The students' pretest t-test results in experimental and control groups

Groups	N	X	S	t	P (significance level)
Control Group	88	16,43	7,44	.473	.637
Experimental Group	89	15,93	6,56		

As shown in table 1, when we look at the t-test analysis made depending on the pre-test results of control and experimental groups; No significant difference was found between the groups where music assisted instruction and traditional method were use ($t = .473, p = .637 > 0.05$). This result shows that the groups of students' pre-information about the subject are close to each other at the beginning.

Table 2. The result of pretest t-test of exam scores applied with Classical and Turkish Art Music in experimental groups

Groups	N	X	S	t	P (significance level)
The Group Listening to Classical Music	45	16,24	7,34	.451	.653
The Group Listening to Turkish Art Music	44	15,61	5,72		

As shown in table 2, when we look at the t-test analysis made depending on the pre-test results of experimental groups listening to Classical Turkish Art Music; No significant difference was found among the groups where music assisted instruction will be used before the instruction ($t = .451, p = .653 > 0.05$). This result shows that the groups of students' pre-information about the subject is close to each other at the beginning

Table 3. The students' posttest t-test results in experimental and control groups

Groups	N	X	S	t	P (significance level)
Control Group	88	19,37	5,32	-6,114	.000
Experimental Group	89	23,84	4,35		

As shown in table 3, at the end of the t-test analysis results made depending on posttest results, a significant difference was found between the groups where music assisted instruction and traditional



method was used ($t = -6,114, p = 0,000 < 0,05$). As a result, it was come out that there was a significant difference between the achievement levels of experimental group educated with music assisted instruction and control group education with traditional method in favor of experimental group.

Table 4. The result of posttest t-test of exam scores applied with Classical and Turkish Art Music in experimental groups

Groups	N	X	S	t	P (significance level)
The Group Listening to Classical Music	45	23,91	4,25	.149	.882
The Group Listening to Turkish Art Music	44	23,77	4,50		

When table 4 was analyzed, no significant difference was found between experimental groups listening to Classical and Turkish Art Music according to the t-test result ($t = .149, p = .882 > 0,05$). This result shows that the type of the music does not have any effect on the students' exam scores. However, this situation reveals the student's success depending on Classical and Turkish Art Music. This situation may vary when exposed to different types of music.

4. Discussion and Suggestions

According to the research findings, a significant difference were found between the exams scores of the students educated with music assisted instruction and traditional method. The average exam score of the students educated with music assisted instruction is higher when compared to the average score of the students exposed to traditional method. It is thought that listening to music types for relaxing especially during the breaks in educational environment; while spending free time would help in increasing efficiency and motivation (Sezer, 2011). On the other hand, in terms of triangles, no significant difference was found when compared the exam scores of the groups listening to Classical and Turkish Art Music. So, the effect of two types of music in the students' test scores was the same extent. However, it was seen that the music type chosen had an positive effect on student group at the end of the study. According to this finding, it is thought that Classical and Turkish Art Music that had a positive effect on especially psychological symptoms might help (Sezer, 2011) in increasing the students' success and motivation at triangles. In the light of the results of this study, following recommendations are presented.

- The students' listening to Classical and Turkish Art Music may help in understanding the course better before teaching triangles a sub learning area of Geometry.
- Music may be used as a supportive method of learning the triangles in educational environment. Scanning studies may be made by taking the students' opinion about this issue.
- It may be recommended to make some other researches by using different music types than Classical and Turkish Art Music before presenting the triangles a sublearning area of Geometry.
- The effect of music on the other subfields of mathematics like triangles related to spatial intelligence.

References

- Ayata, E., Aşkın, C. (2008). The Effect of Music on Cognitive Function of the Brain. *Journal of Istanbul Technical University*, 5(2),13-22.
- Boettcher, W. S., Hahn, S. S., Shaw, G. L. (1994). Mathematics and Music: A Search for Insight into Higher Brain Function, *Leonardo Music Journal*, 4, 53-58.
- Büyükoztürk, S. (2007). Data Analysis Manual for the Social Sciences (8. Edition). Ankara: PegemA. Publishing.
- Ekiz, D. (2003). Introduction to Research Procedure and Methods in Education: Qualitative, Quantitative, and Critical Theory Methodologies (1.Edition). Ankara: Anı Publishing.



- Geoghegan, N., Mitchelmore, M. (1996). Possible effects of early childhood music on mathematical achievement. *Australian Research in Early Childhood*, 1, 57-64.
- Göğüş, G. (2008). Relationship between musical and mathematical learning success. *Journal of Faculty of Education XXI (1)*, 79-89.
- Karasar, N. (2006). *Scientific Research Methods, Concepts, Principles, Techniques*, (16.Edition). Ankara: Nobel Publishing.
- Rauscher, F. H. (2003). *Can Music Instruction Affect Children's Cognitive Development?*. *ERIC Clearinghouse on Early Education and Parenting (September)*. [Online]: Retrieved on 21 July-2012, at URL: <http://www.ericdigests.org/2004-3/cognitive.html>
- Sezer, F. (2011). Effect of music on anger and Psychological Symptoms. *International Journal of Human Sciences volume 8 (1)*, 1472-1493. [Online]: Retrieved on 21 July-2012, at URL: <http://www.InsanBilimleri.com>
- Shaw, G. L. (2003). *Keeping Mozart in Mind* M.I.N.D.Institute. Published (September) [Online]: Retrieved on 22 March 2012, at URL: <http://www.mindresearch.net/>
- Tarman, S. (2002). "Introduction The Investigation and Evaluation of Reliability and Validity of Music Talent Exams." *Unpublished PhD Thesis*. Gazi University, Institute of Education Sciences, Ankara.
- Yener, S. (2004). DNA Passwords and Genetic Music. *Ataturk University, Journal of the Institute of Social Sciences*, 3 (1), 97-102.
- Zatorre, R. (2005). Music the food of neuroscience? *Nature*, 434, 7031; Pro-Quest Science Journals.