

THE EFFECT OF MUSIC TO THE EXAM SCORES IN MUSIC SUPPORTED TESTS MADE ABOUT SPECIAL-DEFINED FUNCTIONS, TRIGONOMETRY AND COMPLEX NUMBERS

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ABSTRACT

We as educators can benefit from various factors in order to let a person go away from his concerns. We may ask ourselves to this question: Is the music, which already exists in human nature, effective in this matter? the answer to this question makes explicit the thought of many families if they are right or not : “studying while listening to music affects the performance in a negative way” in this regard, the study of “The Mozart Effect” made in 1993 in order to research the relationship between music and education is a significant step. In this sense, the maths exams of the 1st. Grade 134 students of 2010-2011 Fall Term of the Mathematics Teaching for Primary School department of Buca Faculty of Education in Izmir Dokuz Eylül University were carried out accompanied by music in different categories. In a stage of the study, the effect of the music selected by students at the Private Defined Functions, Trigonometry, Complex Numbers subjects on their exam unpoints was analysed one by one. In the other stage, the effect of gender on their exam unpoints at the Private Defined Functions, Trigonometry, Complex Numbers subjects accompanied by music was analysed one by one. The results come up with these studies are thought to shape the related studies in future about music-aided mathematics teaching.

Keywords: mathematics teaching, music-aided mathematics, music, success

INTRODUCTION

If we have a look at the process of human life since the past, we witness the establishing contact among them from the struggle for survival to facilitating the living conditions. Namely, the humans' progression towards the social life slowly with the humans' starting to produce meaningless sounds, then transferring the meaning from ear to ear orally and then agreement by using symbols and texts, requires the transfer of information to be permanent and systematic. The information transfer's being permanent and systematic can only be the product of education. So, the education needs innovations in the changing and developing world in order to satisfy the

needs such as reducing the concerns encountered during the process, achieving the effective learning, answering the individual's needs.

Today's society needs individuals who overcome the problems and can solve problems, so we see that the place and the importance of Mathematics as a discipline found boring, unpopular, and abstract (difficult, nightmare in student's language) by the students gradually increasing (Nadide Yılmaz). People are concerned about obscurity and that they cannot understand (Liebeck, 1984:245). One of the characteristic features of Mathematics' being abstract (Baki and Bell, 1997:2.34) can be shown as a reason to the concern occurred in this field. In addition, the attitude of the family may affect the students. Because, the attitudes of the parents have a role in students' success (Jacobs and Bleeker, 2004). In this regard, the attitudes and concerns towards Mathematics may affect the success in Mathematics.

So we can develop different ideas to make the mathematics staying in the process of the education more pretty and understandable. The question "Wondering that, is the music existing in human nature effective in this matter?" may come to mind. Because the music is effective in mobilizing the people without reason, mathematics on the other hand is effective in mobilizing the nature (Winkel, 2000: 5). "Music is a training tool. Education with music gaining importance in the field of education, the concepts and the practices of education with music, basically originated from music' being an effective and efficient educational tool. It is known all along that, music is a tool facilitates or strengthens learning and teaching in various fields and levels of education. Music is way and method of education. Education through music having an important role in the field of education, the concepts and the practices of education in music, basically, originated from making music's being effective and efficient way of education. It is known all along that, music is a method providing, facilitating, and reinforcing particular learning and teaching (Uçan, 1994:13)."

Looking at the studies made in the field of education with music, in the study of Mozart Effect one of the most notable researches made by Frances Rauscher in 1993, the three-dimensional thinking test is applied to 38 students studying psychology at the United States after making them listen to Maj. Re Piano Sonata (K.V.448) written for two pianos by Mozart for 10 minutes. As a result, it is determined that the group listening to Mozart gained 8-9 more points when compared with the control group.

The theoretical physicist Gordon Shaw on the other hand, argued that Mozart's music provided brain gym and said as this "we believe that complex structured music facilitates the communication among specific complex neural organizations related to high level brain activities such as mathematics and chess. In contrast, we think that music which is simple and based on repetitions can create an opposite effect." In the study on this subject, the mice are made listen to Mozart's music for a long time and it is observed that they were more successful at solving labyrinth. It is determined that the increase in learning levels of the mice has been effective for 4 hours after the music was stopped.

Background music's effect on human's mental work was investigated in Günay's (1978) Ph.D. thesis "The effect of background music on human's work". In the study, a group from primary 4th grade students was chosen, the forms including four operation activities were applied to this group for 20 days, one day with accelerator the other day with steady making background music. Achievement levels of the students were introduced in the form of a chart and it was brought out that background music affected the mental work positively.

As Yavuz (2001: 200) stated in the subject of the use of music in learning environments; "The purpose in using musical-rhythmic intelligence in learning environments is not teaching musical skills to the students. Many teachers think that their musical experience is not enough and do not want to use music as an educational tool. The music skill or education is not necessary to use it as a tool in the classes." In this regard, using the music as an educational tool, using it as a background in the classes may be a useful method in terms of its educational function. The use of this method in the field of mathematics may be useful for reduction of anxiety, the end of nightmare, and the increase of success.

The Aim of the Study

In this study, it was tried to determine which direction is the effect of gender and the music preferred on the students' marks gained from the exams applied with music and based on the subjects Special Defined Functions, Trigonometry and Complex Numbers in.

METHOD

An experimental study creates the method part of the study. Two separate sections were created to perform the study. In the first section, the achievement scores of the students participated to the study were determined by applying exams based on Special Defined Functions, Trigonometry and Complex Numbers to them with different types of background music. In the second part on the other hand, the achievement scores were determined by applying exams based on Special Defined Functions, Trigonometry and Complex Numbers to the same group without music. The exam questions belonging to the subjects Special Defined Functions, Trigonometry and Complex Numbers in the scale applied as pre-test in the practicing process answered by 13 homogeneous groups, the scores of the exams were compared as with and without music according to the music preferences and gender by analyzing with the help of SPSS statistical program.

The Population and the Sample of the Study

The research was made with 134 of the freshmen in Izmir Dokuz Eylul University, Buca Faculty of Education, and the department of Elementary Mathematics Teaching in 2010-2011 in fall semester.

Data Gethering and Analysis

The students participating the research were divided in to 13 homogeneous groups before the application. These homogeneous groups took the exams applied at a particular time period with test-parallel-test method. The validity and the reliability of the test has calculated with SPSS statistical program and the reliability coefficient was 0,83. Correlation's being close to 1.00 means that the test is highly reliable (Tarman, 2002).

FINDINGS

Table 1. The results of the students' scores from the exams based on trigonometry with and without music

Groups	The Order of Music	The Type of Music in the	The Score taken with Music	The Score taken without
GROUP 1 (21 people)	5. Nature Music %43	Nature Music	50	49
GROUP 2 (10 people)	5. Classical Music %60	Classical Music	46	51,25
GROUP 3 (7 people)	1. Sufi Music %57	Sufi Music	32	48

As shown in table 1, the first group of students' average score was (50) from the exam they took with nature music which was the fifth preference of %43 of them in trigonometry subject, their average score from the one without music was (49), only 1 point higher. The second group of students' average score was (46) from the exam they took with classical music which was the fifth preference of %60 of them, their average score from the one without music was (51,25), 5,25 points less. The third group of students' average score was (32) from the exam they took with Sufi music which was the first preference of %57 of them, their average score from the one without music was (48), 16 points less. Nature music, in trigonometry subject, did not affect significantly the scores of the students taking the exam with the music which was their fifth preference. Classical music reduced the scores of the students taking the exam with this music which was their fifth preference. Sufi music significantly reduced the scores of the students taking the exam with this music which was their first preference.

Table 2. The results of the students' scores from the exams based on Special Defined Functions with and without music

Groups	The Order of Music	The Type of Music in the Exam	The Score taken with Music	The Score taken without Music
GROUP 4 (10 people)	5. Classical Music %50	Classical Music	45	32
GROUP 5 (10 people)	1. Pop Music %40	Pop Music	20	26
GROUP 6 (10 people)	5. Classical Music %40	Classical Music	37	23
GROUP 7 (9 people)	1. Soft Rock Music %33	Soft Rock Music	15	38

As shown in table 2, the 4th group of students' average score was (45) from the exam they took with classical music which was the fifth preference of %50 of them in Special Defined Functions subject, their average score from the one without music was (32), 13 points higher. The fifth group of students' average score was (20) from the exam they took with pop music which was the first preference of %40 of them, their average score from the one without music was (26), 6 points less. The 6th group of students' average score was (37) from the exam they took with classical music which was the fifth preference of %40 of them, their average score from the one without music was (23), 14 points higher. The 7th group of students' average score was (15) from the exam they took with Soft Rock music which was the first preference of %33 of them, their average score from the one without music was (38), 23 points less. Classical music increased the scores of the students taking the exam with this music which was their fifth preference. Pop music reduced the scores of the students taking the exam with their first preference of music. Soft rock music significantly reduced the scores of the students taking the exam with their first preference of music.

Table 3. The results of the students' scores from the exams based on Complex Numbers with and without music

Groups	The Order of Music	The Type of Music in the Exam	The Score taken with Music	The Score taken without Music
GROUP 8 (11 people)	1. Sufi Music %36	Sufi Music	56	47
GROUP 9 (9 people)	1. Soft Rock Music %55	Soft Rock Music	58	62
GROUP 10 (9 people)	5. Nature Music %55	Nature Music	82	62
GROUP 11 (9 people)	5. Classical Music %33	Classical Music	49	34
GROUP 12 (10 people)	5. Nature Music %40	Nature Music	46	32
GROUP 13 (9 people)	1. Nature Music %66	Nature Music	43	32

As shown in table 3, the 8th group of students' average score was (56) from the exam they took with Sufi music which was the first preference of %36 of them in Complex Numbers subject, their average score from the one without music was (47), 9 points higher. The 9th group of students' average score was (58) from the exam they took with soft rock music which was the first preference of %55 of them, their average score from the one without music was (62), 4 points less. The 10th group of students' average score was (82) from the exam they took with nature music which was the fifth preference of %55 of them, their average score from the one without music was (62), 20 points higher. The 11th group of students' average score was (49) from the exam they took with classical music which was the fifth preference of %33 of them, their average score from the one without music was (34), 15 points higher. The 12th group of students' average score was (46) from the exam they took with nature music which was the fifth preference of %40 of them, their average score from the one without music was (32), 14 points less. The 13th group of students' average score was (43) from the exam they took with nature music which was the first preference of %66 of them, their average score from the one without music was (32), 11 points higher.

Sufi music, in Complex Numbers subject, increased the scores of the students taking the exam with the music which was their first preference. Soft Rock music reduced the scores of the students taking the exam with this music which was their first preference. Nature music significantly increased the score of the students taking the exam with this music which was their fifth preference. Nature music significantly increased the scores of the students taking the exam with this music which was their first preference. Classical music significantly increased the scores of the students taking the exam with this music which was their fifth preference.

Table 4. The results of the male female students' scores from the exams based on Trigonometry with and without music

	N	Minimum	Maximum	Mean	Std. Deviation
Female's score without music	29	,00	88	51,34	20,51
Female's score with music	29	13	87	47	18,16
Male's score without music	9	25	50	41,66	8,84
Male's score with music	9	25	63	43,11	14,33

As shown in table 4, the female students' average score was (51,34) from the exam they took without music, their average score from the one with music was (47), 4,34 points higher. In trigonometry subject, the male students' average score was (43,11) from the exam they took with music, their average score from the one without music was (41,66), 1,44 points higher. Although music reduced the female students' test scores in trigonometry subject, did not significantly affect the male students'.

Table 5. The results of the male female students' scores from the exams based on Special Defined Functions with and without music

	N	Minimum	Maximum	Mean	Std. Deviation
Female's score without music	32	,00	80	32,50	17,41
Female's score with music	32	,00	100	38,78	26,80
Male's score without music	7	,00	40	17,14	17,99
Male's score with music	7	,00	60	20,28	19,67

As shown in table 5, in Special Defined Functions subject, the female students' average scores was (38,78) from the exam they took with music, their average score from the one without music was (32,50), 6,28 points higher. In Special Defined Functions subject, the male students' average score was (20,28) from the exam they took with music, their average score from the one without music was (17,14), 3,14 points higher. Music increased both the male and female students' test scores in Special Defined Functions subject.

Table 6. The results of the male female students' scores from the exams based on Complex Numbers with and without music

	N	Minimum	Maximum	Mean	Std. Deviation
Female's score without music	45	,00	100	41,36	26,37
Female's score with music	45	,00	100	55,45	24,34
Male's score without music	12	20	100	41,81	28,91
Male's score with music	12	20	100	56,36	28,02

As shown in table 6, in Complex Numbers, the female students' average scores was (55,45) from the exam they took with music, their average score from the one without music was (41,36) 14,09 points higher. In Complex Numbers subject, the male students' average score was (56,36) from the exam they took with music, their average score from the one without was (41,81), 14,54 points higher. Music increased both the male and female students' test score in Complex Numbers with the same rate.

RESULTS AND SUGGESTIONS

RESULTS

In trigonometry subject, music reduced the test scores of the female students taking the exam with classical music which was their fifth preference and their scores from the exam with Sufi music. However, music did not affect both the test scores of the male students in trigonometry subject and the test scores of the students taking it with nature music which was their fifth preference. Music increased the test scores of the male and female students, the scores of the students taking the exam with their fifth preference classical or nature music, the scores of the students taking it with their first preference Sufi and nature music. In contrast, music reduced

the test scores of the students taking the exam with Soft Rock music which was their first preference. In Special Defined Functions subject, music increased the male and female students' test scores, the scores of the students taking the exam with their fifth preference classical music. However, music reduced the test scores of the students taking the exam with Soft rock music which was their first preference.

SUGGESTION

- ✓ We believe it provides advantages in answering the question correctly that the students whose first preference is soft Rock music should not solve problems with this music in Complex Numbers and Special Defined Functions subjects.
- ✓ We think that the students' solving problems with nature music in trigonometry subject does not affect answering the questions correctly. However, in trigonometry subject, solving problems without Sufi and classical music may positively affect answering the question. At the same time, in trigonometry subject, the female students' solving problems without music may create advantages in answering the question correctly.
- ✓ We think that, in Complex Numbers subject, without regarding their first or fifth preference, solving problems with Sufi and classical music positively affects their answering the questions correctly.
- ✓ We believe that in special Defined Function subject, both female and male students' solving problems with music is useful for answering the questions correctly.
- ✓ We think that in Special Defined Functions subject, if the students whose first preference was pop or soft rock music solve problems with music it positively affect their answering the question correctly. However, the students' solving the problems with music which was their fifth preference creates benefits in answering the questions correctly.

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