

.The Effect of Music on Creativity and Academic Progress in Mathematics Lessons among Elementary School Students

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Introduction

Creativity is a fundamental ability and characteristic that needs to be taught in the early stages of life, especially in childhood. The education system has always given importance to the issue of fostering creativity in students, especially in the elementary school through the content of lessons and teaching methods. In this regard, attention to artistic tools in fostering creativity, especially music education, is emphasized. Music and musical rhythms have a positive effect on students' creativity, and students who are more talented in the field of music also show creativity in other learning and performance skills. Music can also have a positive effect on students' academic progress in mathematics. Music is created by putting different notes together at different times and intervals, and it plays an important role in increasing creativity and academic progress in mathematics. American researchers stated that when listening to music, the human brain is wired in such a way that it establishes a connection between color and music based on the feeling that melodies create. Hong Kong researchers compared children who had been taught music with another study and concluded that children who had previously been taught music had significantly stronger verbal memory and were also more creative in their work. The present study examined three main questions to investigate the effect of music on students' creativity and academic progress in mathematics, which are:

3. Is there a significant difference between creativity and its dimensions in students who have received music education and male and female students who have not received music education?
2. Is there a significant difference between the academic performance of mathematics in students who have received music education and students who have not received music education?

3. Is there a significant difference in the dimensions of creativity (fluency, originality, flexibility, and expansion) between students who have received music education?

Materials and Methods

The research was conducted in a causal comparative method and the research sample was selected purposively. In this regard, 54 male and female elementary school students in Shiraz who had received music education and 54 students who were matched based on gender and educational level and did not receive music education were selected and evaluated using the Torrance Creativity Scale(1997) and a researcher-made mathematics test. The validity and reliability of the instruments were examined.

Results and Discussion

In examining the first research question, multivariate analysis of variance statistics showed:

Based on gender, no significant difference was observed in the fluency dimension ($F=4.11$, $DF=3$, $P=4.52$). No significant difference was observed in the originality dimension ($F=3.35$, $DF=3$, $P=10.4$). No significant difference was observed in the flexibility dimension ($F=3.02$, $DF=3$, $P=4.39$). In the elaboration no significant difference was observed ($F=4.50$, $Df=3$, $P=4.00$). In the total score was not observed. No significant difference was observed ($F=1.18$, $Df=1$, $P=.27$). Comparisons based on group (students who received music education and students who did not receive music education) showed that in the fluency dimension ($F=40.12$, $DF=1$, $P=.001$) a significant difference was observed, The total mean of the fluency dimension in the experimental group was higher than the mean of the control group. A significant difference was observed in the originality dimension ($F=1.659$, $DF=1$, $P=.001$). The total mean of the originality dimension in the experimental group was higher than the mean of the control group. In the flexibility dimension a significant difference was observed ($F=43.05$, $DF=1$, $P=.002$). The total mean of the flexibility dimension in the experimental group was higher than the total mean in the control group. In the elaboration dimension a significant difference was observed ($F=10.04$, $DF=3$, $P=.001$). The total mean of the elaboration dimension in the experimental group more than the total mean in the control group. Finally in creativity a significant difference was observed ($F=25.05$, $DF=3$, $P=.001$). The total mean of creativity in the experimental group more than the total mean in the control group.

In examining the second research question, the results showed that there was no significant difference in the mathematics score between the two groups of male and female students in the gender variable. There was also no significant

difference based on group . There was no significant difference based on group and sex interaction. In examining the third research question, the results based on the repeated measures analysis of variance test showed that there was a significant difference between the four dimensions of creativity in students who received musical training..The fluency dimension having the highest mean and the originality dimension having the lowest mean.

Conclusions

The results of the present study emphasized the role of music on students' creativity, but no significant results were obtained regarding academic achievement in mathematics. Regarding the role of music in different dimensions of creative thinking, it can also be said that in music, students become familiar with order, symmetry, and harmony between sounds and the creation of patterns from sounds. Therefore, combining, evaluating, and juxtaposing musical notes to create a musical group is the same thought pattern that plays a role in the emergence of creative thinking. Regarding the lack of effect of music on mathematics lessons, it can be said that the issue of music being unimportant in education and upbringing leads to students' motivation and their type of thinking.

References

- Amirahmadi, A.(2020). *Studying the effect of using interactive multimedia software in promoting students' creativity with an emphasis on learning basic mathematical skills*, Sixth National Conference on New Approaches in Education and Research, Mahmoud Abad. (In Persian)
- Badelleh, A., Nosrat, N.,& Soleimani-Rad, V.(2019). The Effect of Robotics Education on Problem Solving Skills in Physics Lessons of Junior High School Students, *Journal of Educational Technology*, No. 1.112-125. (In Persian)
- Fachini, R and Roinin, V (2020). A Granular Local Search Matheuristic for a Heterogeneous Fleet Vehicle Routing Problem with Stochastic Travel Times, *Networks and Spatial Economics*, 11(3),3-11.
- Gonzalez, M (2019). More Than Meets the Ear: Investigating How Music Affects Cognitive Task Performance, *Journal of Experimental Psychology Applied*, 15(1), 123-137.
- Kokkidou, M (2022). Music Definition and Music Education: many perspectives, many voices, many questions, *Greek Society for Music Education (GSME)*, 6(7), 345-369.
- Mohammadabadi, N.,&Yousefi, F.(2022). The effectiveness of educational darts game on the enthusiasm for learning mathematics in first grade

- female students, *Management and Humanities Research*, 11, 1068-1077. (In Persian)
- Mahdavi Najmabadi, Z., Kadivar, P., Arjomandnia, A., & Poushneh, K. (2020). A study of the relationship between visual spatial processing and working memory with creativity and mathematics anxiety: the mediating role of mathematical self-efficacy and social intelligence, *Innovation and Creativity in Humanities*, 9(4),1-34. (In Persian)
- Mahdavi, A., Narimani, R., Nazari, L., Yadegari, Z.,&Jafari-Kaleiber, F. (2020). *The Effect of Music on Children's Intelligence and Creativity*.First International Conference on Educational Sciences, Psychology and Human Sciences. (In Persian)
- Mridul, J and Gagrath, G. (2019). Impact of Music on Student's Academic Performance, *Impact of Music on Student's Academic Performance, Academic Performance*, 6(2), 344-359.
- Pérez, F. María, C. Núñez, A. Molero, M. Gázquez, J. Rosário, P. Núñez, C. (2020). The Role of Anxiety in the Relationship between Self-efficacy and Math Achievement / El papel de la ansiedad en la relación entre la competencia percibida y el rendimiento en matemáticas, *Psicol. educ. (Madr)*; 26(2), 137-143.
- Rahmi, J.(2019). A composite study of the relationship between self-efficacy and academic achievement of high school students in English, focusing on the role of the field of study, *Linguistic Research in Foreign Languages (Foreign Languages Research)*, 34(3), 315-351. (In Persian)
- Ryan, V. Fitzmaurice, O. and O'Donoghue, J (2021). A study of academic achievement in mathematics after the transition from primary to secondary education, *SN Social Sciences*, 1.173-196.
- Sangngam, S (20191437). *The development of creative thinking problem solving abilities for early childhood from the full STEM Education model, EasyChair preprints are intended for rapid dissemination of research results and are integrated with the rest of Easy Chair*.EasyChair-Preprint-1639.pdf
- Sohrabi, M.(2019). *Studying the effect of music on improving mathematical learning disorders*, Third Conference on Mathematics Education and Application, Kermanshah. (In Persian)
- Shahsavari, N., &Habibzadeh, A.(2020) .The effectiveness of active group music therapy on active memory and mathematics achievement of students with specific mathematics learning disabilities, *Summer Studies in Psychology and Educational Sciences*, 7(2), , 451-462. (In Persian)
- Seif A.A.(2001). *Educational Psychology, Learning and Educational Psychology*, Tehran: Agah Publications, 0th Edition. (In Persian)