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THE EFFECT OF "FRACTION FUNK MUSIC" IN TEACHING FRACTION TOWARDS SPECIAL EDUCATION

[1*]Ooi Zhi Khang, [1]Lew Hao Zhe, [1]Lim Sheng Ren, [1]Lim Zhi Sean & [1]Hanani Harun Rasit

Mathematics Department, Institute of Teacher Education Technique Education Campus, Bandar Enstek, Negeri Sembilan.

[*]*ooi08-688@epembelajaran.edu.my*

ABSTRACT

This study explores the effect of using Fraction Funk Music (FFM) in teaching fractions to primary school students with special educational needs (SEN). Fractions are essential to the primary school curriculum, and a deep understanding of fractions is crucial for future mathematics learning. However, teaching fractions can be challenging, especially in inclusive classrooms, where students with SEN may have misconceptions about fractions. One common misconception is that fraction operations require only memorization of rules and procedures, leading to a superficial understanding of fractions. To address this issue, this study used a simple experimental design with ten Year 5 students with SEN from a school in Seremban, Negeri Sembilan. FFM, a teaching aid that incorporates music, was used to teach the addition of fractions to students. Pre- and post-tests were administered to measure the learning outcomes of the students. The results indicate that the use of FFM has led to a significant improvement in the student's understanding of the addition of fractions. These findings suggest that the integration of music can be an effective tool for teaching the addition of fractions to students with SEN. The proposed improvements can guide future research on the use of music-based teaching aids for mathematics learning. Overall, this study emphasizes the importance of effective teaching strategies for students with SEN, especially in teaching fractions. FFM can be a valuable teaching aid to promote a deeper understanding of the addition of fractions, and teachers can incorporate music into their teaching to engage students with diverse learning needs. Further research can explore the effect of FFM on other mathematical concepts and diverse student populations.

Keywords: Fraction, Music, Special Education, Student Special Needs

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INTRODUCTION

Fractions play a crucial role in the primary school curriculum, laying the groundwork for mathematical comprehension and problem-solving abilities (Mahama & Kyeremeh, 2023). To fathom concepts such as proportional reasoning, measurement, and real-world applications involving parts and wholes, students must comprehend fractions. However, teaching fractions can be difficult, especially for students with special educational needs (SEN), who may require additional assistance and alternative instructional strategies to comprehend these abstract mathematical concepts effectively.

Teaching fractions to students with SEN presents educators with specific challenges. SEN students frequently struggle to conceptualize and manipulate abstract concepts, making fractions difficult to comprehend and manipulate. In addition, they may have difficulty with the language and vocabulary associated with fractions, impeding their ability to interpret and communicate mathematical concepts accurately. According to Hayes and Bulat (2017), SEN students may also have individualized learning requirements that necessitate individualized strategies to address their cognitive, sensory, or physical impairments. Consequently, there is an increasing demand for effective teaching strategies that can be implemented in inclusive classrooms to support the diverse learning requirements of all students, including those with SEN.

In order to cultivate a sense of belonging, respect, and equity, inclusive classrooms aim to create an environment where students of all abilities can learn together. According to Wahyuni et al. (2019), to ensure that SEN students can access and engage with the curriculum, it is necessary to employ effective teaching strategies that are tailored to their specific requirements. These strategies should include differentiated instruction, multisensory approaches, and the use of assistive technologies and visual aids to improve comprehension and motivation. By implementing these strategies, educators can design inclusive learning environments that empower SEN students to develop a firm foundation in fractions and mathematics while fostering their overall academic development and self-confidence.

LITERATURE REVIEW

Fractions are a fundamental aspect of mathematics education, requiring students to understand and manipulate numerical quantities that represent part-whole relationships. However, teaching fractions can be a challenging task, especially in inclusive classrooms where students with special educational needs (SEN) may exhibit difficulties in understanding and applying fraction concepts (Namkung et al., 2018). In recent years, researchers and educators have been exploring innovative teaching strategies to address these challenges and enhance the learning experiences of students with SEN (Bottge et al., 2004).

One common misconception among students especially SEN is the belief that fraction operations require only the memorization of rules and procedures, rather than a deeper conceptual understanding (Trivena, et al., 2017). This misconception can hinder students' ability to apply fraction concepts flexibly and solve real-world problems effectively. To combat this issue, researchers have explored the potential of integrating music into mathematics instruction as a means of engaging students with diverse learning needs and promoting deeper conceptual understanding.

Several studies have investigated the impact of music-based teaching aids on mathematics learning, showing promising results. For example, Holmes and Hallam (2017) conducted a research to show that the potential of active music-making for improving pupils’ achievement in spatial–temporal reasoning. They found that music can enhanced students' understanding and

recall of multiplication facts.

Alice Hammel and Ryan Hourigan (2011) conducted multiple research studies focusing on the education of music for students with special needs. Their book, titled "Teaching Music to Students with Special Needs," provides comprehensive insights into various types of disabilities. These disabilities encompass cognitive, communication, behavioral and emotional, physical, and sensory impairments. By gaining a thorough understanding of these diverse disabilities falling within the special needs spectrum, teachers can effectively customize their music lessons to accommodate the unique needs of each student in their classroom.

In the specific context of fractions, the use of music as a teaching aid has shown potential to enhance understanding and engagement. A study by Azaryahu et al., (2019) investigated the effects of a song-based intervention on fraction knowledge among primary school students. The researchers found that students who received the intervention showed significantly greater improvement in fraction understanding compared to those who did not. The incorporation of music helped students internalize fraction concepts, reinforcing the understanding of part-whole relationships.While these studies provide preliminary evidence for the efficacy of music-based teaching aids in mathematics instruction for students with SEN, there is a gap in the literature regarding the specific use of music in teaching fractions to students with SEN. This study aims to address this gap by exploring the effect of Fraction Funk Music (FFM) on the understanding of fraction addition among primary school students with SEN.

By examining the existing literature on music-based instruction in mathematics and its impact on students with SEN, this study contributes to the growing body of research on effective teaching strategies for inclusive classrooms. The findings of this study can provide valuable insights for educators, highlighting the potential of FFM as a valuable tool for enhancing the learning experiences of students with SEN in the context of fractions. Furthermore, it can inform future research on the integration of music-based teaching aids for other mathematical concepts and diverse student populations.

RESEARCH QUESTION AND OBJECTIVE OF STUDY

There are many studies stated about the integration of music in learning Mathematics for mainstream students, but there are insufficient information about integration of music for the students with SEN. Hence, this study might contribute in the field of the special education. For this reason, the purpose of the current study is to determine the effects of Fraction Funk Music (FFM) in teaching the addition of fraction to the students with SEN. Therefore, answer to the following research question were sought in the study:
Research question: How does Fraction Funk Music (FFM) impact the teaching of fractions to students with SEN?

Through the research question, we can make the hypothesis in this study, which are:

H_0: There is no significant difference between the achivement score of the students with SEN before and after learning the addition of fraction with Fraction Funk Music (FFM).
H_1: There is a significant difference between the achivement score of the students with SEN before and after learning the addition of fraction with Fraction Funk Music (FFM).

METHODOLOGY

The method used in this research is the experimental method research. Experimental research is the investigation where one or more dependent variables is manipulated to measure the effect on one or more variables. This method is important in situations where testing of theories or hypothesis is at the centre of the study (Wabwoba & Ikoha, 2011). The type of experimental design is used in this study is the pre-experimental design, which is the researcher studies a single group and provides an intervention during the experiment (Creswell, 2014). Hence, this study only involving one group pre-test and post test design, which mean this experiment will not involving in the comparison of another group, but only examine the target with the initial test and the final tests. The procedure of the experiment is carried out through three steps, which are: (1) measuring the score of the pre-test; (2) giving the treatment to the target; (3) measuring the score of the post-test after the treatment is done. This design pattern can be described as follows:

Figure 1: *One group pretest-posttest design*

O_1	X	O_2

Information:

- O_1 : Pretest is given before getting the treatment being tested.
- X : Treatment, in this case the use of Fraction Funk Music
- O_2 : The posttest given after the treatment is completed

To conduct the study, the 10 pupils in Negeri Sembilan states are chosen as the target of the study. There are 3 (30%) girls and 7 (70%) boys with a mean age of 11 years old and they were identified as the students with SEN such as ADHD, autism and down syndrome. All of them will have an assessment (pre-test) before learning the addition of fraction to determine their level in this topic. Then, they will learn this topic through the FFM. The Fraction Funk Music (FFM) is a song about the method of solving the addition of fraction. The song lyric of FFM will teach students how to solve the addition of fraction. Finally, the assessment (post- test) will be given to determine the students' understanding to this topic. After that, the data obtained will be analysed by using the Statistical Package for Social Science (SPSS) version 27 software.

RESULTS AND FINDING

Pre-test and post-test were used as an instrument in this study. They were 100 marks. The scores of pupils were used to find the achievement level of pupils after the Fraction Funk Music (FFM) was applied in the teaching and learning session. Simple pre-test and post-test were used to test the achievement level of experimental group. The pupils were given half an hour to complete the test.

Descriptive Statistics

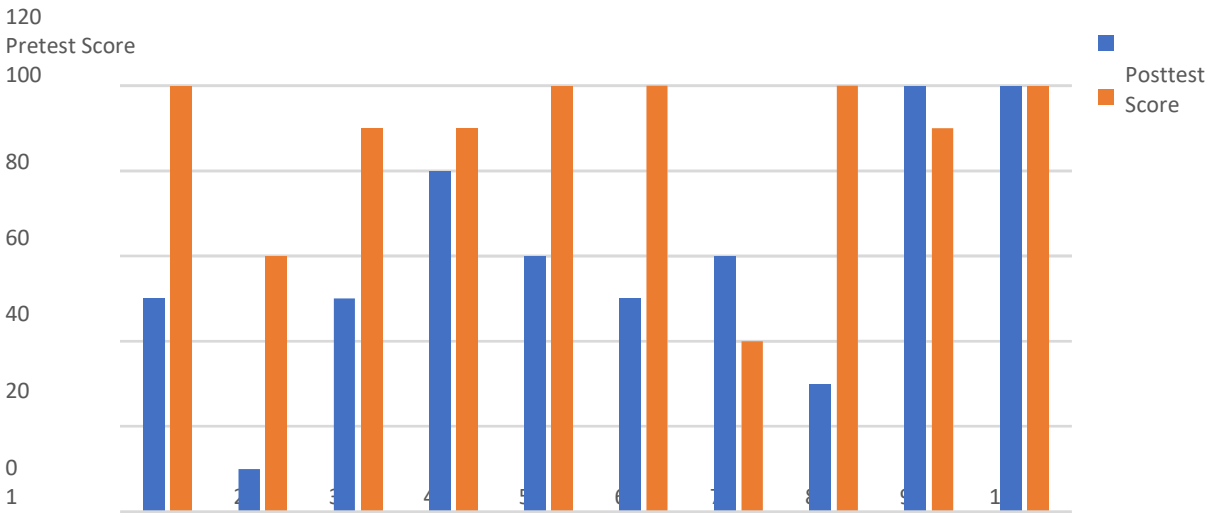
Table 1: *Percentage of Pre-test and Post-test Scores*

Score Range (%)	Pre-test	Percentage (%)	Post-test	Percentage (%)
Low (0 – 64)	7	70	2	20
High (65 – 100)	3	30	8	80
	Min	59	Min	87

A comparative analysis results and findings was expressed in terms of percentage and mean. Table 1 indicated that the pre-test and post-test scores into distinct performance levels to facilitate the interpretation of participants' progress. The categories used were 'Low' for the score range between 0 to 64 and 'High' for the score range of 65 until 100. These categories were determined based on the guide of Malaysia grading system (KPM, 2022).

Specifically, scores below a certain threshold were classified as 'Low,' indicating that participants exhibited limited understanding of fraction addition concepts before learning using the 'Fraction Funk'. Scores above the threshold were classified as 'High,' indicating a relatively stronger understanding of the topic prior to the intervention. The categories were determined based on the distribution of average post-test scores and the improvement observed compared to the pre-test scores. These categorizations allowed us to observe and compare participants' performance levels before and after the intervention, providing insights into the effectiveness of the FFM intervention in enhancing participants' understanding of fraction addition concepts. The results of the study are illustrated in the bar graph as shown in figure 2.

Figure 2: *Pre-test and Post-test Total Score of Learning Outcomes for Year 5 Inclusive Pupils*



The bar graph indicates a comparison of the pre-test and post-test scores among the10 participants. The columns represent the pre-test scores, grouped together with the corresponding post-test scores, enabling a visual comparison of the participants' progress in understanding the addition of fractions. The higher the column, the greater the improvement observed in the post-test scores, indicating enhanced comprehension following the Fraction FFM intervention. All the

participants showed improvement from the pre to post test. However, the 9th participant's pre-test score is better than their post-test score, likely due to emotional problems experienced during the post-test, particularly among the SEN students.

Inferential Statistics

Table 2: *Mean and Standard Deviation of Pre-test and Post-test*

Score	Mean	N	Standard Deviation
Pre-test	59.00	10	28.460
Post-test	87.00	10	20.575

Table 2 shows the mean and standard deviation of the pre-test and post-test scores. The results showed that the pre-test score (M= 59) was lower compared to the post-test (M= 87). In this context, it can be concluded that there is a slight change in the mean performance

level of the test result. After that, a paired t-test was applied to test the difference in the mean variable of the pre-test and post-test.

Table 3: *Paired Sample T-test Result on Pre-test and Post-test*

Pair	Mean	Standard Deviation	Standard Error Mean	t	df	Sig. (2-tailed)
Pre-test Post-test	-28.000	30.478	9.638	-2.905	9	0.017

The inferential statistic above shows the results of paired sample t-test that was applied to test the significant difference between the mean score of the pre-test and post-test scores. Based on statistics, the t value is -2.905, while the test's significant value (2-tailed) obtained is 0.017 and it is less than 0.05. Therefore, it can be said that there is a significance difference between the overall mean of pre-test and post-test. A significant value is less than 0.05 and has rejected the null hypothesis. So, there is a significant difference between the overall mean of the pre-test score (M= 59, S. D= 28.460) and the overall mean of the post-test score (M= 87, S.D = 20.575).

DISCUSSIONS

The Role Of FFM In Enhancing The Understanding Of Fraction Addition

Fraction Funk Music (FFM) has shown significant potential in enhancing the understanding of fraction addition among students with special educational needs (SEN). The incorporation of music into mathematics instruction provides a multisensory and engaging learning experience, which can facilitate the internalization of fraction concepts. FFM combines rhythmic patterns, catchy melodies, and lyrics that specifically address fraction addition, creating a unique and memorable learning environment.

Music has the ability to tap into students' emotions and cognitive processes simultaneously, making the learning of abstract concepts more accessible and enjoyable. The rhythmic patterns and melodic structures in FFM can assist students with SEN in internalizing the sequential steps involved in fraction addition. The repetitive nature of music aids in reinforcing key concepts, helping students develop a solid foundation in fraction addition.

The Impact Of Music On Engagement And Learning For Students With SEN

Engagement is a critical factor in the learning process, particularly for students with SEN. Music has proven to be an effective tool for capturing and maintaining students' attention, creating a positive and inclusive learning environment. The use of FFM in teaching fractions helps to actively engage students, fostering their participation and motivation.

Music-based instruction also caters to diverse learning styles and preferences. Students with SEN often possess unique strengths in areas such as auditory processing or rhythmic intelligence. By incorporating music, educators can leverage these strengths to enhance the learning experience and promote a deeper understanding of fraction addition. The use of FFM capitalizes on the power of music to stimulate memory recall, aiding students in retaining and applying fraction concepts.Implications For Inclusive Classrooms And Special Education

The findings of this study have significant implications for inclusive classrooms and special education. Inclusive classrooms aim to provide equitable opportunities for all students, including those with SEN. By incorporating FFM into fraction instruction, teachers can cater to the diverse learning needs of their students, creating an inclusive and supportive learning environment.

FFM can serve as an effective teaching aid for special education teachers, who often face the challenge of engaging and motivating students with diverse learning needs. The use of music-based instruction not only enhances students' understanding of fraction addition but also promotes a positive and enjoyable learning experience. FFM can contribute to building students' self-confidence, as they experience success and a sense of accomplishment in their mathematical abilities.

Furthermore, the implementation of FFM in inclusive classrooms encourages collaboration and peer support. Students can work together to create rhythm and melody while solving fraction addition problems, fostering social interaction and cooperative learning.

In conclusion, the use of Fraction Funk Music (FFM) as a teaching aid holds great potential in enhancing the understanding of fraction addition among students with special educational needs. The engaging and multisensory nature of music-based instruction facilitates active participation, motivation, and a deeper conceptual understanding of fractions. FFM provides a valuable tool for educators in promoting inclusive mathematics education and fostering positive learning experiences for students with SEN. Further research can explore the broader applications of music-based teaching aids in mathematics instruction and their effects on diverse student populations.

CONCLUSION

In conclusion, this study explored the effectiveness of using Fraction Funk Music (FFM) as a teaching aid for primary school students with special educational needs (SEN) in understanding the addition of fractions. The results indicated a significant improvement in the pupil's understanding of fractions after applying FFM in Teaching and Learning (TnL). The findings suggest that integrating music into the teaching of fractions can be an effective strategy for engaging students with SEN and promoting a deeper understanding of mathematical concepts. With this, further studies can explore the application of music-based teaching aids for other mathematical concepts beyond fraction addition, broadening our understanding of their efficacy in supporting mathematics learning for students with SEN. By further exploring the potential of music-based teaching aids, we can continue to develop evidence-based practices that promote inclusive mathematics education and facilitate the academic success of students with SEN. Overall, this study underscores the significance of innovative and engaging teaching methods to support the learning outcomes of students with SEN and facilitate their mathematical growth.

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