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Effectiveness of Rhythmic Movement on Children's Emotional Intelligence in the Post-Pandemic Era

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Abstract
Research has shown that the 2021 lockdown demotivated children from attending school. This study investigated the effect of musical rhythmic movement on the emotional intelligence of 12-year-old students. Participants were 17 Malaysian primary school children (N=17). Using the Emotional Intelligence Inventory (assessing self-awareness, self-regulation, motivation, empathy, and social skills), results demonstrated significant improvement following intervention (pre-test M=6.11, post-test M=6.95, SD=1.45). The paired t-test revealed a statistically significant improvement in scores (t(16) = -2.39, p = .02, 95% CI = [-1.58, -0.097]). These findings substantiate the efficacy of rhythmic movement in enhancing emotional intelligence, suggesting its potential value for educational integration, particularly in addressing post-COVID motivational and emotional challenges.

Keywords: Music Education; eurhythmics; rhythmic movement; paired T-Test

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1.0 Introduction

The Ministry of Education developed the music curriculum in the Malaysian primary education system around 1985 (Ismail, 2017). The curriculum teaches children to sing, play musical instruments, and use movement to explore musical concepts such as rhythm, melody, harmony, timbre, texture, and expression. The current music curriculum is the Standards-Based Curriculum for Primary School (*Kurikulum Standard Sekolah Rendah* - KSSR), which equips children with 21st-century skills, enabling them to play, learn music theory, play instruments, and sing. Additionally, schools offer extracurricular activities such as choirs, music ensembles, and orchestras to encourage student participation in music. Children can develop creativity by expressing creative ideas and enhancing their appreciation of musical aesthetics (BPK, 2016). Despite changes to the curriculum, singing and playing percussion instruments remain vital components of teaching and learning music in the classroom. Higher education institutions offer specialised courses in music, such as composition, performance, and music education. The government and various organisations support these initiatives by providing resources and training opportunities for both students and music teachers, ensuring the continuous development and effectiveness of music education nationwide. However, the reality of today's education is oriented towards the "one size fits all" concept (Schleicher & Zoido, 2016).

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Children at school study hard, focusing mainly on science, technology, engineering, and mathematics (STEM) subjects. Most of them frequently undergo the learning process in complex situations, such as reading for hours, discussing in depth, and learning statically with teachers. They perceive that practising these activities can enhance their intellectual intelligence and help them excel in examinations. The movement restriction order enforced in 2020 and 2021 has indirectly shifted the country's educational landscape from physical to virtual. Currently, physical education has resumed. Previous studies have shown that many children are stressed and lose motivation to continue studying at school (Wang et al., 2021; Yim et al., 2022). Education through rhythmic movement could meet the children's needs and inspire them to keep learning at school. This study introduces a rhythmic movement approach inspired by the old music teaching method, Dalcroze Eurhythmics, as a strategy to boost children's motivation. This study aimed to determine whether musical movement activities could enhance the emotional skills of 12-year-old students following the COVID lockdowns. Thus, the objectives of this study are as follows:

1) To identify the effectiveness of rhythmic approach activities in improving children's emotions.
2) To compare the difference in efficacy between rhythmic movement activities and conventional methods on the domains of emotional intelligence, namely self-awareness, self-regulation, motivation, empathy, and social skills.

2.0 Literature Review

Rhythmic movement is a teaching strategy in both music education and physical education (Bremmer & Nijs, 2024; Rigon et al., 2024). The rhythmic movement in physical education, used to sharpen physical skills, was introduced by Rudolf Laban (1879-1958). In contrast, Émile Jacques-Dalcroze (1865–1950) formalised eurhythmics, a pedagogical approach using rhythmic movement to develop children's musical perception and physical coordination. The rhythmic movement concepts in Dalcroze's and Laban's teachings share a common foundation in the elements of time, space, and energy. Essentially, this involves the precise musical coordination of the body. Dalcroze introduced three key elements in eurythmics: rhythmic movement, solfege, and improvisation (Greenhead, 2022). Rhythmic movement is the most crucial and closest musical element to human beings (Ismail et al., 2021). Dalcroze proposed this component by connecting the elements of time, space, and energy to create a perfect rhythmic movement. The three elements are strongly related and impact one another. An individual can explore music by performing movements such as walking, galloping, jumping, and skipping according to the song's rhythm. The combination of movements increases children's appreciation of and love for music. Dalcroze introduced rhythmic movement as an activity that helps students focus and strengthen their concentration and coordination skills (Rui, 2022). The interaction between brain and body functions can be used optimally through rhythmic movement. Dalcroze believed the brain's primary function is to receive and analyse stimuli before transmitting instructions to the body. Nevertheless, the interaction between the brain and body parts depends on the strength of an individual's nervous system. Rhythmic movement can be utilised to motivate children, as their souls are attracted to sounds, particularly when they are followed by movement.

Adamczyk et al. (2022) explained that a rhythmic learning activity, or eurythmy, involves overall mental use and kinesthetic awareness. The learning activity uses a physical approach that allows students to listen and respond to musical stimuli, thereby engaging the senses. This effect will send signals to the brain, enabling it to understand the activity performed. The initial eurythmic activity is generally started by walking to respond to changes in tempo, dynamics, and song phrases. Students can learn to control their bodies by describing music in terms of energy and body weight. Teachers may recognise the musical elements present: beats, meters, rhythms, phrases, and forms. Ismail et al. (2023) found that scheduled, consistent rhythmic movement activities led to measurable improvements in children's rhythmic accuracy. This point underscores the importance of consistency: these scheduled activities, which include structured rhythm exercises, directly enhance children's understanding of rhythmic concepts such as pitch and tempo. The approach can foster children's inclination towards learning music and create an engaging learning environment in the music class by involving two groups of children. Extending this principle, Mulyaningsih et al. (2022) position rhythmic movement as a foundational method for teaching core musical elements, notably rhythmic sensitivity and expressive movement. This approach is relevant and appropriate for improving children's musical skills. According to Md Jais (2017), there are two types of movement: movement in place and movement in space. Movement in place involves clapping, swinging, turning, bending, humming, talking, and singing.

On the other hand, movement in space includes walking, running, crawling, jumping, galloping, and skipping. These movements can be diversified using low, medium, and high levels. It can also be performed independently in coordination with other body parts. Every movement can explore and experience various musical qualities. The statement also aligns with Wang (2022), who stated that aural training is insufficient for helping children learn music. Rhythmic movement can help children love and appreciate music. This connection is plausible because rhythmic movement is a fundamental, often subconscious, human behaviour. Dynamic elements are entirely dependent on movement elements. Specifically, the time element gives rise to tempo markings such as *allegro*, *andante*, *accelerando*, and *ritenuto*. Conversely, the energy element produces dynamic markings like *forte*, *piano*, *crescendo*, and *diminuendo*. The body can realise these elements due to the intensity of musical feeling, depending on the intensity of bodily sensation.

3.0 Methodology

This study used a quantitative, pre-test and post-test design. Specifically, the researcher used a survey-based intervention involving rhythmic movement to measure its impact on students' emotional intelligence. According to Ismail et al. (2021), survey research is a descriptive approach that gathers information through tools such as questionnaires, tests, and observations, and is commonly used to capture educational and social perspectives. The sample consisted of 17 children (11 boys and 6 girls) from an urban primary school in

Malaysia, selected by the school. The children were identified as underachievers and exhibited traits associated with emotional issues. The sample of rhythmic movement activities is illustrated in Fig. 1.

Fig. 1: Simulation of rhythmic movement activities
(Source: Author's collection)

The researchers used the Emotional Intelligence Inventory (EII) survey to collect data for this study. In developing the survey, the researchers identified the core domains of emotional intelligence: self-awareness, self-regulation, motivation, empathy, and social skills. The researchers designed the Emotional Intelligence Inventory (EII) based on established theories and then validated it with primary school teachers. Each domain comprised 5 items, yielding a total of 28. The survey used a 9-point semantic scale (1 = Strongly Disagree, 9 = Strongly Agree) for each item to accurately measure children's emotional responses. The items for self-awareness included statements such as "I always think positively about myself and others," assessing the child's ability to recognise their thoughts. For self-regulation, items like "I can control my feelings" measured the child's control over their emotional responses. The survey also measured motivation, empathy, and social skills using targeted items such as 'I try my best to achieve my ambition' (intrinsic motivation), 'I care when my friends are sad' (empathic understanding), and 'I can make friends easily' (social interaction ability). The researchers distributed the survey at the end of the intervention. The questionnaire functioned to evaluate the strengths and weaknesses of the activities performed. A pilot study involving 30 primary school students was undertaken to test the instrument's reliability. The findings indicated that the average Cronbach's alpha (total items) for the five core domains fell within an acceptable range.

The implementation of rhythmic movement activities lasted 4 hours. In rhythmic movement activities, students engage in a variety of exercises that blend music and motion. They form a circle, waving towels to the beats of the Malay children's song "*Lompat-Lompat*," moving together in sync with the music and swinging their arms rhythmically. They sing the song phrase by phrase, clapping to the melody, and dance in groups or pairs when the teacher plays it. Additional activities include animal-themed movements where students mimic different animals, choosing their preferred animal actions and performing motions such as walking, jumping, tiptoeing, or galloping. Scarves are incorporated into the activity as students dance and roll balls across them in sync with the musical phrases, fostering a dynamic, interactive learning experience. In another set of activities, students form five groups, each forming a "train" line with a leader at the front. They move to the song's tempo, following their leaders' actions as they walk in a train formation. To reinforce rhythm, students pat their friends on the shoulder in time with the song and sing together as they follow their leader's movements. In group settings, they create and perform unique dance routines, presenting them to the class to encourage creativity, coordination, and teamwork in a musical context. The activity is visualised in Fig. 2.

Fig. 1: Rhythmic movement activity
(Source: Author's collection)

4.0 Findings

The results of the Paired T-Test indicated a statistically significant difference between students' mean scores before (M = 6.11) and after (M = 6.95) the test, with a standard deviation of 1.45. The analysis revealed a 95% confidence interval for the difference in scores, ranging from -1.58 to -0.097, demonstrating a consistent increase in post-test scores. The obtained T value was -2.39, with a p-value of 0.02, which is below the standard significance threshold of 0.05. These findings indicate that the increase in post-test scores is statistically significant, supporting the effectiveness of the intervention conducted. The results were reported and illustrated in Table 1 and Fig. 3.

Table 1. Paired T-Test

Pair	Mean	SD	95% Confidence Interval of Difference		T-value	Sig.
Pre Test	6.11	1.45	Lower	Upper	-2.39	0.02
Post Test	6.95		-1.58	-0.097		

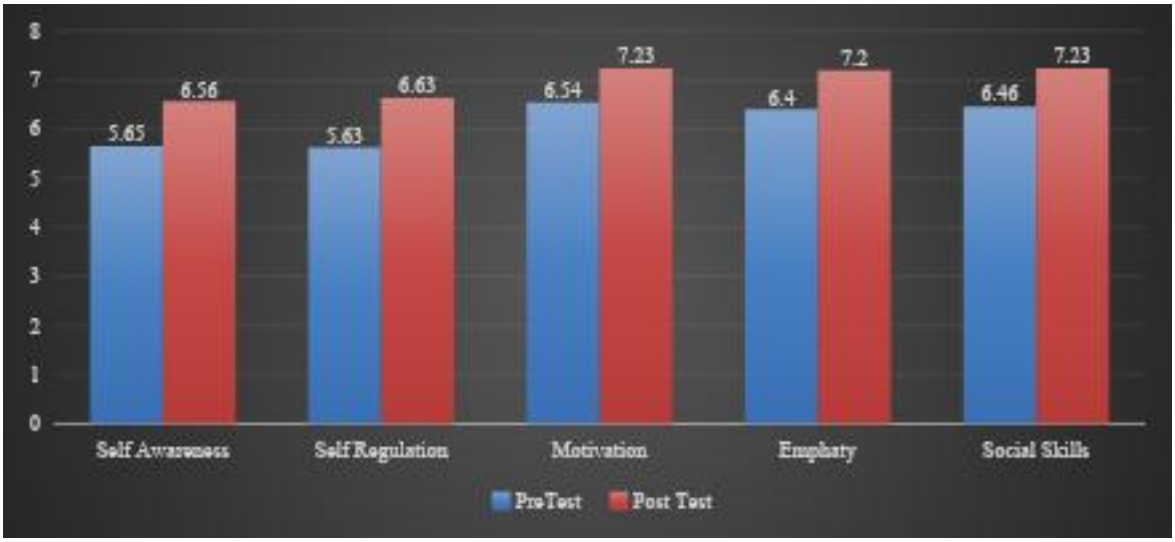

Fig. 3: Graph of post-test scores is statistically significant

5.0 Discussion

The results indicated a statistically significant improvement in students' mean scores from pre-test to post-test, demonstrating the effectiveness of the rhythmic movement intervention. The paired T-Test analysis showed a significant increase in mean scores from before the intervention (M = 6.11) to after the intervention (M = 6.95), with a standard deviation of 1.45. The 95% confidence interval for the difference in scores ranged from -1.58 to -0.097, supporting a consistent improvement in students' emotional intelligence and motivation. The obtained T value of -2.39, with a significance level of p = 0.02, falls below the 0.05 threshold, indicating that the increase in post-test scores is statistically significant. These results highlight the positive impact of rhythmic movement activities on children's emotional intelligence, underscoring their integration into educational programs to support emotional and social competencies, especially in the post-pandemic context. The findings indicate a statistically significant improvement across all five domains of emotional intelligence following the intervention. Self-awareness scores increased from M = 5.65 (pre-test) to M = 6.56 (post-test), and self-regulation improved from M = 5.63 to M = 6.63. Motivation showed the most significant gain, rising from M = 6.54 to M = 7.23. Empathy scores also increased from M = 6.4 to M = 7.2, and social skills improved from M = 6.46 to M = 7.23. These results suggest that the rhythmic movement intervention positively impacted students' emotional intelligence, with motivation and social skills showing the greatest improvements, highlighting its effectiveness in enhancing emotional and social competencies. Aryani (2020) stated that one way to foster children's confidence in learning is to provide them with the flexibility to learn independently. Efforts to support learning include giving children tasks and time to practice, so they can become proficient and skilled.

Studies on the rhythmic movement concept have shown that children can perform natural movements and gain musical experience through movement and sensory-motor skills. This experience translated into knowledge through the interaction among children, involving musical activities, games, and improvisation. Nevertheless, Dalcroze's approach cannot be interpreted as a music-and-movement-only activity, as it also focuses on vocabulary development and the analysis of combinations of music and movement across the fields of physics, physiology, and psychology. According to Dalcroze, early instrument training should provide children with the flexibility to explore the instrument, enabling them to distinguish between rhythm and pitch and master improvisation skills. They must learn to respond fully to the rhythm concept and play attentively (Apaydın, 2023). The transfer of learning, variety of training, pre-training, and paying attention are four cognitive psychology motor learning concepts closely related to teaching musical instruments that involve

rhythmic movement. The present study found that rhythmic movement positively affects children's emotions. In the transfer-of-learning aspect, the rhythmic movement method involves gross motor skills linked to kinesthetic skills. Incorporating a range of rhythmic movement activities could make learning music concepts more engaging and dynamic. Dalcroze noted that teachers may expose children to musical experiences before they play a musical instrument. Therefore, children must attend pre-training musical activities to enhance their musical abilities.

They can initially be introduced to solfa and locomotor movement exercises to help them understand the underlying musical ideas. According to the study, paying attention can increase an individual's externally focused kinesthetic awareness, which involves focusing on the environment rather than solely on oneself. In this study, rhythmic movement activities are guided by awareness and comprehension of Dalcroze's theory, which is appropriate for all age groups, not just children. Teachers and children need to be aware of the value and techniques of rhythmic movement, as the world of children is closely linked to sound, movement, games, and the use of natural behaviours in learning. Some techniques allow children to listen and move, followed by kinesthetic mastery using songs. Children learn to make parallel and precise movements in time with the music's tempo, dynamics, and other elements. Children should explore movement, guided singing, and the mastery of solfa during the developmental phase. They could explore various genres of music in eurythmic and improvisational aspects. Rhythmic movement exercises serve as a basis for attracting children's attention, increasing their enthusiasm for learning new topics, and improving their musicality. This finding is consistent with Yew et al.'s (2022) explanation that effective learning among children can be achieved when they have sufficient space to move and play. Music classes are conducted in an active, movement-based learning environment where children engage rhythmically by singing and moving rather than sitting passively. They focus attentively on the music, responding through coordinated movements and interpreting the rhythm kinesthetically. These movement patterns are then transferred to musical instruments, enabling children to play along with the song. This immersive process demonstrates their full engagement in musical activities, which enhances kinesthetic development. The findings align with Herman's (2022) argument that rhythmic movement fosters a dynamic interplay between sensory perception, musical expression, cognitive processing, emotional response, and physical motion.

6.0 Conclusion & Recommendations

Learning music through rhythmic movement helps children adapt to modern education in this challenging era. Current educational challenges include mastering high-level learning and adapting to daily life. Children should have strong self-resilience, emotional intelligence, confidence, and courage to innovate and explore knowledge at school. After the COVID-19 vaccine provision stage, physical and hybrid forms of learning are possible in the school environment. Therefore, children are required to be physically and spiritually prepared when returning to school. Hence, learning music using a rhythmic movement approach is hoped to motivate and attract children to study at school and face the challenges of 21st-century education, where higher-order thinking skills (HOTS) are critical. Children can explain and justify solutions to problems by answering carefully constructed questions. For example, the teacher can ask the children about the relationship between body movements and music. This action can give children the opportunity to relate the movement of their own bodies to music. When they can keep pace with the tempo, express their movement, and move in time with the rhythm, children are perceived as able to apply knowledge, skills, and values to create new things.

The study's findings have broadened the scope of the rhythmic music approach. Prior studies and theories indicated that rhythmic movement has been used to enhance musical teaching methods, musical instrument playing, vocal performance, music therapy, and dance (Buetow et al., 2014; Doonan & Bräuninger, 2015; Shimizu et al., 2018). This study tested a rhythmic movement intervention, proving that it enhanced musical skills and children's motivation. The study recommended that the rhythmic movement approach be emphasised in primary schools. Teachers are advised to incorporate more eurythmic and extracurricular activities into class to create a more active and engaging learning environment. Local songs and traditional musical instruments such as *kompang*, *rebana*, and drums can accompany this activity. Traditional musical instruments can indirectly strengthen the appreciation of the nation's heritage arts through music. A key limitation of the study is its small sample size, which limits the generalizability of its findings to the broader student population. However, the researcher believes that eurythmic-based music teaching can further develop children's potential and human development. It is also recommended that further study should be undertaken using a mixed-methods approach with a larger number of respondents.

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Paper Contribution to the Related Field of Study

By integrating Dalcroze Eurhythmics with emotional intelligence metrics (self-awareness, self-regulation, motivation, empathy, and social skills), the research bridges a critical gap between embodied learning theories and practical pedagogical strategies. The study extends traditional applications of Eurhythmics by linking it to contemporary educational challenges, offering policymakers and educators actionable insights to foster holistic student resilience through music-based interventions.

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