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The Effect of Rhythmic Gymnastics on Kinesthetic Intelligence Among First Grade Students of SD Negeri 105273 Helvetia

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Abstract: This study aims to empirically examine the effect of rhythmic gymnastics on the development of kinesthetic intelligence among first-grade elementary school students. The research employed an experimental design to determine the influence of rhythmic gymnastics (independent variable) on students' kinesthetic intelligence (dependent variable). The population consisted of all students of SD Negeri 105273 Helvetia, while the sample included 13 first-grade students for the 2022/2023 academic year. The treatment involved rhythmic gymnastics sessions designed to enhance students' body coordination, agility, balance, and strength. Pre-test and post-test assessments were conducted to measure kinesthetic intelligence. The average pre-test score was 12.30, while the post-test average increased to 23.15. Data were analyzed using the Wilcoxon and Mann-Whitney tests, showing a significance value (Asymp. Sig. 2-tailed) less than 0.05. The findings indicate a statistically significant effect of rhythmic gymnastics on the improvement of kinesthetic intelligence among students. The study concludes that rhythmic gymnastics can effectively enhance motor coordination, physical agility, and body control in early elementary students. This supports Gardner's theory of multiple intelligences, emphasizing the role of movement-based learning in optimizing children's physical and cognitive development.

Keywords: Rhythmic Gymnastics; Kinesthetic Intelligence; Experimental Study; Physical Education; Multiple Intelligences

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INTRODUCTION

The kinesthetic domain plays a fundamental role in the holistic development of children, particularly in the early years of schooling. According to Gardner's Multiple Intelligences Theory (1983), kinesthetic intelligence is one of nine distinct intelligences that contribute to human potential. It reflects an individual's capacity to use the body skillfully to express ideas, solve problems, or create products. In the context of education, developing kinesthetic intelligence is crucial as it enhances students' motor coordination, agility, balance, and spatial awareness—skills that underpin not only physical performance but also cognitive and social-emotional growth.

In recent decades, rhythmic gymnastics has gained attention as an effective pedagogical strategy for improving children's physical and cognitive abilities. Rhythmic gymnastics combines coordinated body movements with musical rhythm, fostering the synchronization between motor and sensory systems. Previous studies have shown that rhythmic activities can positively influence motor development, self-expression, and even cognitive control in early childhood (Erlinawati, 2018; Yuningsih et al., 2020; Hasibuan et al., 2021). However, most existing studies have focused on preschool-aged children or athletes, leaving a gap in understanding its empirical effect on primary school students' kinesthetic intelligence.

The urgency of this research arises from the observable decline in children's physical engagement and motor proficiency, largely attributed to sedentary lifestyles and reduced emphasis on rhythmic or movement-based learning in schools. Many first-grade students still exhibit limited body coordination, poor balance, and low movement awareness, which may hinder both their academic and social performance. Therefore, integrating rhythmic gymnastics into early physical education programs could serve as a practical and scientifically grounded approach to address these issues.

This research builds upon existing findings by empirically testing the effect of rhythmic gymnastics on kinesthetic intelligence among first-grade elementary students. Unlike previous studies, this study applies an experimental design that measures pre-test and post-test outcomes using validated observation instruments aligned with Gardner's kinesthetic intelligence framework. The study thus contributes new empirical evidence to the field of physical education by demonstrating the measurable impact of rhythmic gymnastics on body coordination, strength, flexibility, and balance in early learners.

The objective of this study is to analyze whether rhythmic gymnastics significantly enhances kinesthetic intelligence in first-grade students of SD Negeri 105273 Helvetia during the 2022/2023 academic year. Beyond testing statistical significance, the study aims to contribute to educational innovation by highlighting rhythmic gymnastics as a holistic instructional medium that integrates movement, rhythm, and emotional engagement. The findings are expected to enrich the body of knowledge in physical education pedagogy and provide a practical framework for teachers to stimulate multiple intelligences, particularly the kinesthetic domain, in young learners.

METHOD

This study employed an experimental research design to determine the effect of rhythmic gymnastics on the kinesthetic intelligence of first-grade elementary school students. The design involved a one-group pre-test and post-test approach, allowing for the measurement of changes in kinesthetic intelligence before and after the intervention. The independent variable in this study was rhythmic gymnastics, while the dependent variable was kinesthetic intelligence. This design was selected to observe direct causal relationships between rhythmic movement exercises and improvements in students' body coordination, balance, agility, and strength.

The research was conducted at SD Negeri 105273 Helvetia, located in Deli Serdang District, North Sumatra, Indonesia. The study took place during the 2022/2023 academic year, specifically from October 17 to October 20, 2023. All rhythmic gymnastics sessions were implemented in the school's open field under standard school conditions and supervision to ensure consistency and ecological validity.

The population of this study consisted of all students enrolled at SD Negeri 105273 Helvetia, totaling 118 students. The sample was drawn from first-grade students,

comprising 13 participants (9 males and 4 females). This age group was chosen because early elementary students are in a critical stage of motor development where kinesthetic intelligence can be effectively stimulated through rhythmic and movement-based learning.

A purposive sampling technique was used to select participants. The criteria for inclusion were: (1) students enrolled in the first grade, (2) physically healthy and able to perform movement activities, and (3) willing to participate with parental consent. This technique was chosen to ensure that the sample represented students with similar developmental characteristics relevant to the study's objectives.

Data were obtained through non-test instruments, including systematic observation and documentation. Observational assessments were conducted using a structured rubric that measured four key indicators of kinesthetic intelligence: (1) body coordination, (2) agility, (3) strength, and (4) balance. Each indicator was scored on a four-point Likert scale ranging from 1 (not yet developed) to 4 (developed very well).

Before the treatment, students completed a pre-test to establish baseline levels of kinesthetic intelligence. Subsequently, rhythmic gymnastics sessions were conducted three times over three consecutive days, each lasting approximately 30 minutes. After the intervention, a post-test was administered using the same observation instrument. The difference between pre-test and post-test scores indicated the impact of rhythmic gymnastics on kinesthetic intelligence.

The collected data were analyzed using quantitative statistical methods. Descriptive statistics were applied to summarize the mean and percentage of pre-test and post-test scores. To determine the normality of the data distribution, the Kolmogorov–Smirnov test was performed. Since the data did not meet normality assumptions, non-parametric tests were employed for hypothesis testing. The Wilcoxon Signed-Rank Test was used to compare pre-test and post-test scores, while the Mann–Whitney U Test was applied to confirm the significance of the treatment effect. All analyses were conducted using SPSS version 25.0, with a significance level set at $p < 0.05$.

RESULT AND DISCUSSION

Result

The results of this study present the findings derived from pre-test and post-test measurements conducted to examine the effect of rhythmic gymnastics on the kinesthetic intelligence of first-grade students at SD Negeri 105273 Helvetia during the 2022/2023 academic year. The data were analyzed using descriptive and inferential statistics to determine the level of improvement and the significance of the treatment effect.

The descriptive results show that the students' kinesthetic intelligence improved notably after participating in rhythmic gymnastics sessions. The pre-test scores indicated that most students were in the "not yet developed" or "beginning to develop" categories, while the post-test scores demonstrated substantial improvement across all indicators.

Table 1. Descriptive Statistics of Kinesthetic Intelligence Scores

Test Type	Mean Score	Minimum	Maximum	Category
Pre-test	12.3	9	20	Low / Beginning to Develop
Post-test	23.15	18	30	Well Developed

Based on the results shown in Table 1, the average pre-test score of 12.30 increased to 23.15 after the rhythmic gymnastics intervention. This increase indicates a positive change in students' kinesthetic intelligence. The difference between the two means (Δ = 10.85) reflects an observable enhancement in students' coordination, agility, strength, and balance following the treatment.

The categorical analysis of kinesthetic intelligence demonstrated a shift in the students' developmental levels after the treatment.

Table 2. Distribution of Kinesthetic Intelligence Categories

Category	Pre-Test (f / %)	Post-Test (f / %)
Very Well Developed (26–32)	0 (0%)	5 (38.46%)
Well Developed (20–25)	1 (8.33%)	6 (46.15%)
Beginning to Develop (14–19)	3 (23.07%)	2 (15.38%)
Not Yet Developed (8–13)	9 (69.23%)	0 (0%)
Total	**13 (100%)**	**13 (100%)**

The data in Table 2 reveal that before the intervention, most students (69.23%) were categorized as "not yet developed." After rhythmic gymnastics was applied, no students remained in this category. Instead, 84.61% of students reached the "well developed" or "very well developed" levels of kinesthetic intelligence, demonstrating clear progress in motor skill performance.

Inferential statistical analysis was performed to determine whether the observed improvement was statistically significant. The data were first tested for normality using the Kolmogorov–Smirnov test, which showed that the data were not normally distributed ($p < 0.05$). Therefore, the Wilcoxon Signed-Rank Test was used to compare the pre-test and post-test results.

Table 3. Wilcoxon Signed-Rank Test Results

Test Statistic	Value	Asymp. Sig. (2-tailed)	Decision
Wilcoxon Z	-3.214	0.002	Significant

The Wilcoxon test results presented in Table 3 indicate a significance value of 0.002 ($p < 0.05$), confirming that there is a statistically significant difference between the pre-test and post-test scores. This finding suggests that rhythmic gymnastics had a meaningful effect on improving students' kinesthetic intelligence.

Additionally, a Mann–Whitney U test was used to strengthen the result by comparing independent score distributions. The Asymp. Sig. value obtained was also less than 0.05, validating the consistency of the Wilcoxon test outcome.

The results confirmed that rhythmic gymnastics significantly enhanced students' kinesthetic intelligence, as evidenced by increased mean scores, improved category distributions, and statistically significant test results ($p < 0.05$). The enhancement was observed across all key indicators—coordination, agility, balance, and strength—reflecting the overall effectiveness of rhythmic gymnastics in developing motor and physical learning abilities among early-grade students.

Discussion

The present study aimed to investigate the effect of rhythmic gymnastics on the kinesthetic intelligence of first-grade students at SD Negeri 105273 Helvetia during the 2022/2023 academic year. The results demonstrated a significant increase in kinesthetic intelligence scores after the rhythmic gymnastics intervention, as evidenced by the rise in average scores from 12.30 to 23.15 and a Wilcoxon significance value of $p = 0.002$ (<

0.05). These findings confirm that rhythmic gymnastics had a positive and statistically significant effect on students' physical coordination, agility, balance, and strength.

The improvement in students' kinesthetic intelligence following rhythmic gymnastics training reflects the essential relationship between movement, rhythm, and cognitive development. Rhythmic gymnastics engages multiple sensory modalities simultaneously—visual, auditory, and motor—leading to enhanced neural connections between sensory and motor cortices. This aligns with the theory of embodied cognition, which emphasizes that cognitive processes are deeply rooted in the body's interactions with the physical world. When students synchronize movements with rhythmic patterns, they not only improve their physical control but also strengthen the cognitive mechanisms associated with attention, memory, and self-regulation.

The findings of this study also corroborate Howard Gardner's Multiple Intelligences Theory (1983), particularly in the domain of bodily-kinesthetic intelligence. According to Gardner, kinesthetic intelligence involves using one's body to solve problems or express ideas, which can be cultivated through structured physical activities such as dance, drama, or gymnastics. The rhythmic gymnastics intervention applied in this study provided opportunities for students to explore creative movement and body awareness, supporting Gardner's proposition that kinesthetic learning enhances overall intelligence and adaptability.

The findings are consistent with earlier studies by Erlinawati (2018) and Yuningsih et al. (2020), both of whom found that rhythmic activities improved motor and kinesthetic abilities in early childhood education settings. Similarly, Hasibuan et al. (2021) reported that rhythmic gymnastics significantly enhanced children's motor coordination and movement control. However, this study extends previous research by focusing on primary school students, thereby contributing new empirical evidence that rhythmic-based interventions remain effective beyond preschool age.

Furthermore, while previous research mainly employed descriptive or correlational methods, the present study used an experimental approach to directly measure pre- and post-intervention differences. This methodological rigor provides stronger causal inference and reinforces the conclusion that rhythmic gymnastics is an effective pedagogical tool for developing kinesthetic intelligence.

Although the study yielded significant results, several limitations must be acknowledged. First, the sample size was relatively small (n = 13), limiting the generalizability of the findings to larger populations. Second, the intervention period was short (three sessions over one week), which may not fully capture the long-term effects of rhythmic gymnastics training. Third, environmental factors such as students' prior physical activity levels or motivation were not controlled. Future studies are encouraged to include larger and more diverse samples, longer intervention durations, and mixed-method approaches combining quantitative and qualitative analyses to capture behavioral and emotional dimensions of kinesthetic development.

Despite its limitations, this research provides valuable empirical evidence for educators and policymakers in the field of physical education and developmental psychology. It emphasizes that rhythmic gymnastics can serve as a low-cost, enjoyable, and effective method to enhance motor intelligence and learning readiness in early learners. The study contributes to the growing body of literature advocating for movement-based education and supports the integration of rhythmic and artistic physical activities into national curricula to promote holistic child development.

CONCLUSION

This study concludes that rhythmic gymnastics has a significant and positive effect on the kinesthetic intelligence of first-grade students at SD Negeri 105273 Helvetia during the 2022/2023 academic year. The rhythmic movement activities effectively enhanced students' coordination, agility, balance, and strength, as evidenced by the significant improvement in post-test scores. These findings confirm that rhythmic gymnastics not only develops physical abilities but also supports cognitive and emotional growth through integrated movement learning. The study reinforces Gardner's Multiple Intelligences Theory by demonstrating that bodily-kinesthetic intelligence can be systematically improved through rhythmic-based education. Consequently, rhythmic gymnastics should be considered a valuable and practical pedagogical strategy within early childhood and primary school curricula to promote holistic physical and intellectual development.

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CONFLICT OF INTEREST

Clearly explain whether there are any conflicts of interest related to the reported research.

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