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Research Article

Improving Student Focus by Implementing Brain Gym Exercises Before Lessons

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ABSTRACT
Learning concentration is a critical factor in students' academic success. However, many students struggle to maintain focus during the learning process. This study examined the effect of Brain Gym on concentration among third-grade students at SDN Bandar Lor 1, Kediri City. Using a quasi-experimental pretest–posttest control group design, 26 students were equally divided into experimental and control groups. The experimental group practiced Brain Gym® for ten minutes before lessons over four weeks, while the control group followed regular classroom routines. Concentration was measured through paper-based tests, observations, and questionnaires, including the Image Difference Test, Number Concentration Test, Word Arrangement Test, and Visual Memory Test. The results revealed that both groups were comparable at pretest (M = 28.62 control; M = 29.92 experimental). At posttest, the control group showed a small, non-significant increase (M = 32.08, p = 0.072), while the experimental group demonstrated a highly significant improvement (M = 53.38, p < 0.001) with a large gain score of 23.46 and effect size d = 3.12. These findings indicate that Brain Gym is an effective, low-cost, and practical classroom intervention that enhances concentration and supports learning readiness.

Keywords: *Articulatory Phonology; Communicative Competence; English Phonology; Learner-Centered Pedagogy; Systematic Literature Review.*

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1. Introduction

Primary education serves as a fundamental stage for the cognitive, emotional, and physical development of children (Chiziwa, 2022). At this stage, the brain undergoes rapid growth in neuroplasticity and neural connectivity, requiring proper stimulation to optimize learning potential and academic achievement (Kesuma, 2022; Prodyanatasari et al., 2023). However, issues such as limited concentration, fatigue, and stress frequently interfere with effective learning (Oliveira et al., 2024). A promising approach to address these challenges is Brain Gym, a movement-based intervention designed to activate brain functions through bilateral coordination exercises (Eissa et al., 2021). Evidence from reviews and empirical studies indicates that Brain Gym enhances focus, working memory, and emotional regulation in school-aged children (Runesi, 2024; Saufi, 2014). These benefits are achieved primarily through increased cerebral blood flow and strengthened interhemispheric integration, supporting more efficient cognitive processing (Lolo, 2019; Harahap et al., 2025).

Structured physical activities such as Brain Gym are shown to improve blood circulation, stimulate neural plasticity, and strengthen cognitive performance (Hillman, 2014). This becomes especially important for elementary students, as their brains remain in a sensitive phase of development. When applied in school contexts, Brain Gym not only supports improved attention and concentration but also helps reduce stress and enhance learning outcomes in an engaging and age-appropriate manner.

Research has demonstrated multiple benefits of Brain Gym across child development domains. For instance, studies show it improves attention in elementary school learners (Anggraini et al., 2023) and reduces stress and anxiety during the learning process (Donnelly, 2016). Additional findings associate Brain Gym with enhanced memory and cognitive functioning, with supporting evidence drawn both from neurophysiological studies in elderly populations (Adriani, Imran, Mawi, Amani, & Ilyas, 2020) and from classroom-based research (Prodyanatasari, 2024). Furthermore, Brain Gym helps build positive learning habits, particularly in numeracy and problem-solving (Agustina & Ardhiani, 2023). Consistent practice has also been linked to holistic development, where physical movement supports cognitive and emotional growth simultaneously (Siroya, Naqvi, & Phansopkar, 2021).

For effective implementation, Brain Gym in elementary schools should be designed to be structured, enjoyable, and developmentally suitable. Ten commonly recommended exercises include Cross Crawl, Hook-ups, Brain Buttons, Lazy 8s, Elephant, Energy Yawn, Double Doodle, The Owl, Arm Activation, and Positive Points (Abdillah, 2018; Suwardianto, Richard, & Kurniajati, 2022). These exercises are most effective when performed before lessons, between sessions, after breaks, or when students appear fatigued, with a recommended duration of five to ten minutes. Consistency and a positive classroom climate are crucial to maximize the benefits.

The literature increasingly highlights Brain Gym's multifaceted contributions to academic and socio-emotional development. Pratiwi and Pratama (2020) found that elementary students who participated in Brain Gym activities showed marked improvements in concentration and task completion. Likewise, Józsa et al. (2023) highlighted that fine motor skills in early childhood are strong predictors of coordination, attention, and cognitive growth, reinforcing the importance of movement-based learning activities such as Brain Gym. Arbianingsih et al. (2021) further emphasized its role in reducing stress and anxiety, while Alcalde, Taype, and Fuentes (2025) demonstrated that students' motivation, confidence, and psychological capital significantly contribute to academic engagement and performance, which are also fostered through Brain Gym practices.

Research focusing on Brain Gym before lessons show pronounced effects. Pratiwi and Pratama (2020) observed that activities such as Cross Crawl and Brain Buttons function effectively as brain warm-ups to increase readiness and concentration. Anggraini et al. (2023) confirmed these results, noting that students performing Brain Gym before class achieved significantly higher levels of focus compared to peers in the control group.

Building upon this evidence, the present study aims to examine the effectiveness of implementing Brain Gym before lessons at SDN Bandar Lor 1. Specifically, it investigates whether pre-class Brain Gym exercises significantly enhance students' concentration levels during classroom learning activities.

2. Method

This study used a quasi-experimental method with a pretest–posttest control group design. This design was chosen to measure differences in students' concentration before and after the Brain Gym intervention, while also making comparisons between the experimental group and the control group. The population in this research was all third-grade students at SDN Bandar Lor 1, Kediri City. From this population, a total of 26 students were involved as the sample. The experimental group consisted of 13 students who practiced Brain Gym before lessons, while the control group also consisted of 13 students who did not receive the intervention. The sampling technique used was purposive sampling, in which the selected classes had similar characteristics, such as comparable academic performance averages and the same number of students.

The variables in this study included the independent variable, which was the implementation of Brain Gym before lessons, the dependent variable, which was the students' concentration during learning activities, and several control variables such as lesson duration, the learning materials used, and classroom conditions. Data were collected using three instruments: concentration tests on paper that contained picture difference and instruction-following tasks, classroom observations, and student questionnaires.

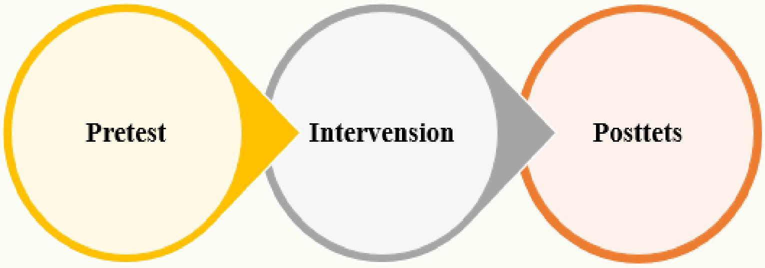


Figure 1. Research procedure showing the stages of pretest, intervention, and posttest.

The research procedure was carried out in three stages. The first stage was the pretest, where both groups were given concentration tests to measure their initial scores, and observations were made on student behavior during lessons. The second stage was the intervention, which was only given to the experimental group. In this stage, the students did Brain Gym exercises for ten minutes every day, from Monday to Friday, before the lesson started, for four weeks. The exercises consisted of four types of movement. The first was Cross Crawl, where students stood upright, lifted their right knee and touched it with their left hand, then alternated by lifting the left knee and touching it with their right hand, continuing the alternating movement for about two minutes. The second was Hook-Ups, where students sat or stood comfortably, crossed their right ankle over the left ankle, stretched their arms forward, crossed the right wrist over the left wrist, interlaced their fingers, and then pulled their hands slowly toward the chest while taking deep breaths, maintaining this posture for two minutes. The third was Brain Buttons, where students placed one hand on their navel while the other hand massaged gently below the collarbone about two to three centimeters from the chest center in circular motion for thirty seconds, then repeated with the other hand. The fourth was Lazy 8s, where students extended one arm forward and traced a sideways figure eight in the air with the index finger, while their eyes followed the movement without turning their head, and after one minute, the exercise was repeated with the other hand. The control group, on the other hand, continued with their normal classroom routine without any intervention. The third stage was the posttest, in which both groups were given the same concentration tests again, followed by another round of observations and questionnaires.

For data analysis, descriptive statistics such as mean, median, and standard deviation were used to describe the data, while inferential statistics were used to test the hypotheses. Paired t-tests were applied to see the differences in concentration before and after the intervention within each group, while independent t-tests were conducted to compare the results between the experimental and the control groups. All statistical tests were performed using SPSS version 25.0, with the significance level set at $p < 0.05$.

To evaluate its effectiveness, students' concentration was assessed through a pretest and a posttest, complemented by behavioral observation sheets. The concentration test instruments consisted of four tasks that were selected because they are age-appropriate, easy to administer, and provide objective results.

The first task was the Image Difference Test, which was used to measure visual attention by asking students to identify differences between two similar pictures. This test is commonly applied in concentration assessments for children because it stimulates careful observation and attention to detail (Figure 2).

Bagian 1: Tes Mencari Perbedaan Gambar

Instruksi: Perhatikan kedua gambar di bawah ini. Temukan 5 perbedaan antara kedua gambar dan lingkari perbedaan tersebut!

Figure 2. Image Difference Test (Question 1)

The second task was the Number Concentration Test, designed to assess working memory and concentration. In this test, students were instructed to circle specific numbers from a sequence according to written instructions. Its basis in standardized testing methods makes it sensitive to variations in performance and reliable for measuring attention (Figure 3).

Bagian 2: Tes Mengikuti Instruksi

Instruksi: Bacalah instruksi berikut dengan cermat, lalu kerjakan sesuai perintah!

1. Lingkari semua angka 5 pada deretan angka di bawah ini!
   4 5 8 5 2 3 1 5 9 8 5 7 5 9 2 3 5 8 9 5 5 8
2. Garis bawahi semua huruf C pada deretan huruf di bawah ini!
   A F B J K C D Y O D W T C P C Q H S C J G L C H C

Figure 3. Number Concentration Test

The third task was the Word Arrangement Test, which measured cognitive flexibility and problem-solving skills. In this test, scrambled letters were presented, and students were asked to rearrange them into meaningful words. This task required not only concentration but also linguistic processing and logical reasoning (Figure 4).

Bagian 3: Tes Menyusun Kata

Instruksi: Susunlah huruf-huruf berikut menjadi kata yang benar!

1. U B K U : ____________
2. S K O L E H A : ____________
3. B J U A : ____________
4. G I P A : ____________
5. S A N M E : ____________

Figure 4. Word Arrangement Test

The fourth task was the Visual Memory Test, which aimed to evaluate short-term spatial memory. Students were shown a set of nine images for 30 seconds, after which they were required to recall and answer questions related to the images they had just observed. This test is effective for measuring nonverbal memory and attention span (Figure 5).

Bagian 4: Tes Memori Visual

Instruksi: Perhatikan gambar berikut selama 30 detik, kemudian tutup gambar tersebut dan jawab pertanyaan di bawah ini!

Figure 5. Visual Memory Test

Together, these four instruments provided a comprehensive measure of concentration by combining visual attention, working memory, cognitive flexibility, and short-term memory. The use of multiple tasks strengthened the validity of the data, as it allowed the assessment to capture different dimensions of concentration relevant to elementary school students.

3. Result

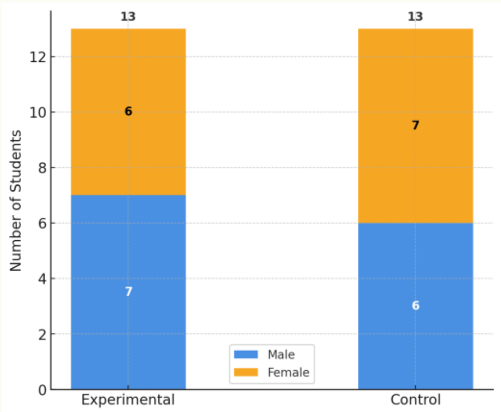
3.1 Respondents' Profile

The respondents in this study were 26 third-grade students at SDN Bandar Lor 1 in Kediri City. They were divided equally into two groups, with 13 students in the experimental group and 13 students in the control group. This equal distribution ensured that both groups had the same class size, which is important to make fair comparisons during and after the intervention.

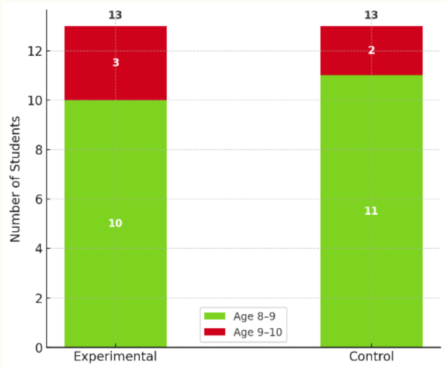
Looking at gender, the distribution was relatively balanced between the two groups. In the experimental group, there were 7 male students (53.8%) and 6 female students (46.2%). Meanwhile, in the control group, there were 6 male students (46.2%) and 7 female students (53.8%). This nearly symmetrical distribution shows that the proportion of males and females was almost the same in both groups. Such a composition is valuable because it minimizes the possibility of gender becoming a factor that influences the outcomes. In other words, if there are differences in the posttest results, they can be more confidently linked to the Brain Gym intervention rather than to differences in gender.

The balanced distribution of gender also reflects one of the principles of experimental research, which is group equivalence at the baseline. When the initial characteristics of the groups are similar, the internal validity of the study becomes stronger. This means that the intervention results can be interpreted more accurately, with less concern about hidden biases caused by demographic imbalance. Furthermore, this balance increases the reliability of the findings and improves their generalizability. Results from such a design can be applied more broadly to populations that include both male and female students.

Age distribution also showed comparable characteristics across groups. In the experimental group, most students were aged 8–9 years, with 10 students (77%) falling into this category, while the remaining 3 students (23%) were aged 9–10 years. In the control group, the composition was similar, with 11 students (85%) aged 8–9 years and only 2 students (15%) aged 9–10 years. This indicates that the majority of respondents in both groups were in the same developmental stage, which is important because concentration ability is closely linked to cognitive maturity. The slight difference in percentages between groups (77% vs. 85%) is small and not statistically significant, so age can be considered evenly distributed.



(a)



(b)

Figure 6. Respondents' characteristics based on (a) gender distribution in experimental and control groups, and (b) age distribution in experimental and control groups.

Figure 6 (a) presents the gender distribution of respondents, while Figure 6 (b) shows the age distribution. These figures confirm that both variables were balanced across groups. Although the number of students aged 9–10 years was smaller, this does not reduce the comparability of the groups. It only suggests that the generalizability of the findings to older elementary students should be interpreted carefully, since most participants represented the younger age group.

From a methodological perspective, the balanced characteristics of respondents by both gender and age strengthen the design of this research. When the baseline conditions of the experimental and control groups are equivalent, any significant differences observed after the intervention can be attributed more confidently to the Brain Gym exercises. Therefore, this equivalence becomes one of the strengths of the study, ensuring that the conclusions about the effect of Brain Gym on concentration are valid and reliable.

3.2 Respondents' Characteristics Based on Ages

At the beginning of the study, before the Brain Gym intervention was conducted, both groups were given pretests to measure their initial concentration levels. The descriptive statistics are presented in Table 1. The control group obtained a mean score of 28.62 with a standard deviation (SD) of 2.47, while the experimental group had a slightly higher mean of 29.92 with an SD of 3.04. The difference between the two groups at this stage was only 1.30 points, which is very small and shows that both groups had almost the same concentration ability before the intervention began.

Table 1. Descriptive statistics of pretest concentration scores in control and experimental groups

Group	N	Mean	SD	Min	Max
Control	13	28.62	2.47	25.0	34.0
Experimental	13	29.92	3.04	26.0	35.0

The distribution of scores also supports this equivalence. In the control group, the lowest pretest score was 25.00 and the highest was 34.00, while in the experimental group the range was from 26.00 to 35.00. The overlapping ranges indicate that the two groups were highly comparable at baseline. Although the experimental group had a slightly larger standard deviation (3.04) compared to the control group (2.47), the variation is minor and does not affect the comparability of the groups.

These results are important from a methodological perspective. The similarity of pretest scores between the control and experimental groups confirms the principle of baseline equivalence, which is crucial in experimental research. With both groups starting from nearly the same condition, any significant differences observed in the posttest can be attributed more confidently to the Brain Gym intervention rather than to initial disparities in concentration levels. This strengthens the internal validity of the study and ensures that the interpretation of later results is more reliable.

Overall, the pretest outcomes demonstrate that both groups began the study in a relatively balanced position. This equivalence provides a solid foundation for interpreting the posttest results, as it allows the analysis to focus directly on the impact of the intervention itself.

3.3 Learning Concentration Before and After Brain Gym

After the four-week intervention, posttest measurements were conducted for both groups to evaluate changes in concentration levels. The descriptive results are summarized in Table 2. In the control group, the mean concentration score increased modestly from 28.62 (SD = 2.47**)** at pretest to 32.08 (SD = 2.78) at posttest. This small gain of 3.46 points indicates only a limited improvement in concentration, and the statistical test confirmed that the difference was not significant (p = 0.072). The control group's scores ranged from 28.00 to 38.00, which shows that although some students performed slightly better at posttest, the overall change was relatively minor.

In contrast, the experimental group demonstrated a very substantial improvement. The mean score rose sharply from 29.92 (SD = 3.04) at pretest to 53.38 (SD = 1.04) at posttest, resulting in a gain of 23.46 points. This increase was highly significant (p < 0.001) and represents a dramatic change in concentration ability. The posttest scores for this group ranged narrowly between 51.00 and 55.00, which indicates that almost all students improved consistently. The very small standard deviation at posttest (SD = 1.04) also shows that the performance of students in the experimental group became more homogeneous, meaning the intervention was effective across participants.

The effect size of the intervention was calculated as **d = 3.12**, which falls into the "very large" category. This confirms that the Brain Gym exercises had a powerful and reliable effect on students' concentration. While the control group's modest improvement may reflect natural learning or practice effects, the sharp contrast with the experimental group highlights the effectiveness of the intervention.

Table 2. Descriptive statistics of pretest and posttest concentration scores in control and experimental groups

Group	N	Pretest Mean ± SD	Posttest Mean ± SD	Min (Post)	Max (Post)	Gain	*p* Value	Notes
Control	13	28.62 ± 2.47	32.08 ± 2.78	28.00	38.00	+3.46	0.072	Small increase
Experimental	13	29.92 ± 3.04	53.38 ± 1.04	51.00	55.00	+23.46	<0.001	Very significant increase
Effect Size	–	–	–	–	–	–	–	*d* = 3.12 (very large)

Taken together, these findings demonstrate that Brain Gym was highly effective in improving students' concentration. The combination of a large mean increase, a very significant *p*-value, and an exceptionally large effect size provides strong evidence that the intervention produced real and consistent improvements. The clear difference between the control and experimental groups also shows that the changes cannot be explained merely by normal classroom activities but are the direct result of the Brain Gym exercises.

3.4 Impact of Brain Gym Intervention

The comparison between the control and experimental groups provides clear evidence regarding the impact of Brain Gym on students' concentration. Although both groups started from almost identical pretest scores, their progress after four weeks was very different. The control group only improved slightly, with a mean score rising from 28.62 (SD = 2.47) to 32.08 (SD = 2.78). This gain of 3.46 points was small and statistically not significant ($p = 0.072$). The modest increase may reflect the normal learning process or natural variations in concentration, but it does not indicate meaningful progress.

In contrast, the experimental group showed a remarkable improvement. The mean score increased from 29.92 (SD = 3.04) at pretest to 53.38 (SD = 1.04) at posttest, giving a very high gain of 23.46 points. This increase was statistically significant with $p < 0.001$. The effect size of this change was calculated as $d = 3.12$, which is classified as very large. These results indicate that the Brain Gym exercises had a powerful and consistent impact on concentration, and almost all students in the experimental group experienced improvement.

The details of this comparison are shown in Table 3. The table makes it clear that the control group did not achieve a meaningful increase, while the experimental group experienced a sharp improvement that was not only statistically significant but also practically important.

Table 3. Comparison of concentration scores and effect of Brain Gym intervention

Group	Pretest Mean ± SD	Posttest Mean ± SD	Gain	*p* Value	Effect Size (*d*)
Control	28.62 ± 2.47	32.08 ± 2.78	+3.46	0.072 (ns)	–
Experimental	29.92 ± 3.04	53.38 ± 1.04	+23.46	< 0.001 (***)	3.12 (Very Large)

Taken together, the data clearly show that Brain Gym had a strong influence on students' concentration. While the control group remained almost unchanged, the experimental group showed a dramatic increase, which confirms that the intervention was effective in improving students' focus and readiness to learn.

4. Discussion

The findings of this study demonstrate that Brain Gym interventions significantly improved students' learning concentration compared to the control group. While the control group showed only a modest increase in posttest scores, the experimental group experienced a substantial improvement with high consistency, as indicated by the very narrow range of posttest scores and the low standard deviation. This confirms that Brain Gym was effective in helping students focus better and sustain attention during learning activities.

The improvement in concentration can be understood through several perspectives. From a neurophysiological view, coordinated physical movements in Brain Gym stimulate both hemispheres of the brain, improving neural connectivity and supporting executive control functions. Dennison and Dennison (2010) highlighted that simple bilateral movements such as Cross Crawl and Lazy 8s enhance brain readiness by activating neural pathways. Studies have also shown that structured physical activity increases blood circulation and oxygen supply to the brain, which in turn strengthens attention and memory functions (Hillman et al., 2014; Tomporowski, 2015). These mechanisms explain why the students in the experimental group showed a very significant increase in concentration after four weeks of Brain Gym practice.

From a psychological perspective, Brain Gym provides conditions that reduce stress while improving focus. Exercises such as Hook-Ups and Brain Buttons regulate breathing and help the body achieve calmness, which supports learning readiness. Research has indicated that Brain Gym improves attention span and reduces anxiety in children, creating a positive state for learning (Arbianingsih et al., 2021). The findings of this study also confirm earlier reports that Brain Gym interventions help students maintain focus longer and reduce fatigue during lessons (Siroya, Naqvi, & Phansopkar, 2021). This is in line with Adriani et al. (2020) and Abdillah (2018), who found that Brain Gym contributes to better cognitive performance in older adults, indicating that the benefits of these exercises can be observed across age groups.

From a pedagogical perspective, the results suggest that Brain Gym can be used as a practical strategy in classroom routines. Implementing short sessions before lessons help students transition from passive to active states more smoothly, reducing the adaptation time needed to begin learning. Donnelly et al. (2016) and Alcalde, Taype, and Fuentes (2025) emphasized that structured and engaging learning activities enhance students' motivation, confidence, and readiness to learn, while Oliveira et al. (2024) highlighted the value of movement-based learning in maintaining attention. The equalizing effect observed in this study, where students' posttest scores in the experimental group clustered tightly, suggests that Brain Gym also supports more equitable classroom learning conditions by reducing variation in concentration levels among students. This aligns with the idea that physical preparation can function as scaffolding that helps students perform better within their learning zone (Harahap et al., 2025).

The findings of this research are consistent with previous studies showing that Brain Gym improves attention, memory, and academic performance in school children (Agustina & Ardhiani, 2023; Józsa, Oo, Borbélyová, & Zentai, 2023; Suwardianto, Richard, & Kurniajati, 2022). The intervention is simple, low-cost, and enjoyable, making it a promising tool for teachers to integrate into daily routines. At the same time, this study has limitations that must be acknowledged. The sample size was relatively small and limited to a single school, the duration of the intervention was only four weeks, and the focus was restricted to concentration without examining other aspects such as academic achievement in different subjects or long-term retention. Future studies should involve larger and more diverse samples, extend the duration of the intervention, and investigate additional student characteristics such as learning styles or socio-emotional factors that may influence the effectiveness of Brain Gym.

Taken together, this study strengthens the argument that Brain Gym can be an effective intervention to improve concentration among elementary school students. The significant improvement, coupled with the high level of consistency among participants, provides strong support for its integration into classroom practice. Supported by empirical evidence and aligned with both cognitive and pedagogical theories, Brain Gym represents a practical strategy that educators can employ to create optimal learning conditions and enhance students' readiness to learn.

5. Conclusion

This study concludes that Brain Gym had a very significant effect on improving the concentration of third-grade students at SDN Bandar Lor 1. The experimental group that practiced Brain Gym consistently before lessons achieved a much higher increase in concentration scores compared to the control group, and the improvement was marked by strong consistency as shown by the narrow score range and very low standard deviation. These findings confirm that Brain Gym is an effective intervention that helps students focus better and maintain attention during the learning process.

The improvement observed in this study can be explained by the way Brain Gym activates neural systems, reduces stress, and prepares students physically and mentally to learn. The exercises not only raised the average level of concentration but also minimized differences among students, creating a more equitable classroom environment. For teachers, the practical implication is that short Brain Gym sessions before lessons can serve as a simple and enjoyable classroom routine that enhances readiness to learn and supports more effective instruction.

At the same time, this study has limitations. The number of participants was small and limited to one school, the intervention lasted only four weeks, and the outcome measured was restricted to concentration. Therefore, the results should be generalized with caution. Future research should involve larger and more diverse samples, extend the duration of the intervention, and explore other variables such as academic achievement, memory retention, and socio-emotional development that may also be influenced by Brain Gym. Therefore, Brain Gym represents a practical and low-cost strategy that can be integrated into elementary school learning routines to improve concentration and readiness. Supported by consistent results and theoretical foundations, Brain Gym holds strong potential to be adopted more widely as part of efforts to enhance students' academic achievement and learning experiences.

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