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Effectiveness of Brain Gym Strategy on Achievement in Social science Among Secondary School Students

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Abstract
Students' performance in social science classes at the secondary level was examined in this research to determine whether the Brain Gym method improved their grades. Using a quasi-experimental design, seventy students from St. Mary's HSS School in Vallakom were split into two groups: one to act as the subject of experimentation and another to act as a control. The participants in the experiment engaged in Brain Gym activities, whereas the control group adhered to conventional Activity-Oriented Methods. Pre-test and post-test evaluations assessed students' accomplishments in multiple cognitive domains: recall, comprehension, application, and analysis. The findings indicated that the Brain Gym strategy significantly enhanced students' academic performance in social science, with notable improvements observed in all cognitive components assessed. Better engagement and learning outcomes were found when physical movement was incorporated into educational practices, according to the study. Next, we talked about what this means for administrators, parents, and teachers, and we proposed some studies to look at how well Brain Gym works in the long run and how we can adapt it to different subjects and student populations.

Keywords: - Brain Gym, Social Science Education, Academic Achievement, Secondary Education, Cognitive Development, Teaching Strategies

I. INTRODUCTION

The use of creative teaching methods in the classroom has grown in significance as teachers look to improve academic achievement and student engagement. The Brain Gym is one such tactic that incorporates brain-enhancing exercises into the teaching-learning process. The idea behind this strategy is that exercise can improve learning results by stimulating cognitive processes (Jensen, 2005). A more dynamic and productive learning environment is what educators hope to achieve by involving students in activities that encourage both mental and physical involvement. There is evidence that students' focus, memory, and overall academic performance can be significantly improved through the incorporation of movement into the classroom. For instance, (Ratey & Hagerman, 2008) found that students' comprehension and memory retention were both improved when they used brain-based learning techniques.

This is especially important in courses like the social sciences, where grasping difficult ideas and using success requires the ability to think critically. The Brain Gym approach provides a useful framework for incorporate these ideas into lessons in the classroom. Finding effective ways to teach that pique students' interest and boost their learning has become an urgent matter in the dynamic subject of education. Pupils may not be adequately prepared for the complicated nature of modern society if they are taught through traditional pedagogical approaches that rely on passive learning and rote memorization. To combat these issues, more and more educators are looking into innovative approaches that integrate physical exercise with cognitive learning. A particular strategy that integrates brain-enhancing activities and exercises into the learning process is the Brain Gym concept. Students' mental and physical health, along with their academic performance, can be substantially improved by incorporating this strategy.

Empirical research in various fields has shown a positive correlation between physical activity and academic success. For instance, (Donnelly et al.,2016) found that including physical activity in the educational program improved students'

attention and academic performance. There is a noticeable absence of targeted studies examining the specific impacts of physical activity on social science proficiency, despite the fact that prior research highlights the benefits of physical activity in general education settings. These void calls attention to the fact that this area desperately needs more studies on the efficacy of brain-enhancing activities. Additionally, as educational institutions prioritize holistic learning methods, it is crucial to recognize that bodily fitness impacts cognitive development. The Brain Gym method does more than just improve students' grades; it also promotes their physical and mental health by getting them involved in the learning process. All things considered, Brain Gym has the makings of a game-changing approach to secondary education, particularly in the humanities and other fields where active student engagement significantly affects final grades. The goal of this research is to determine the efficacy of the Brain Gym method in improving the social science performance of secondary school students. The study's overarching goal is to provide empirical evidence regarding the impact of this strategy on students' motivation, engagement, and ability to retain information in the social sciences. Improving instructional strategies and creating a more engaging learning environment for students are the primary objectives of this study. Insightful information about innovative methods of teaching will be provided.

II. BACKGROUND OF THE STUDY

A more information-driven society has emerged during the past decade. We are beginning to see a dramatic paradigm change in pedagogical practices to better suit the needs of the contemporary classroom, driven in large part by the pervasiveness and economic importance of computers and other types of electronic communication. Traditional classroom practices alone will not be enough to equip today's youth to compete in the global economy. Conventional teaching methods will need to be either modified or replaced with extraordinary educational experiences if these needs are to be met. The idea of incorporating movement into the classroom as a means to enhance cognitive function and academic performance is gaining increasing amounts of attention. Brain Gym, a set of physical exercises designed to stimulate the brain, is one approach that is gaining traction in many educational settings. (Williams, 2018) states that this method is founded on the premise that physical and mental stimulation substantially improves learning outcomes, particularly in fields such as the social sciences that demand understanding and analysis. Despite its widespread application, there is a lack of evidence showing its effectiveness in specific academic domains. For many students, the challenges they face in social science classes stem from a lack of interest, memory problems, or stress. In order to produce well-informed people who can actively participate in societal issues, social science education is essential, making the resolution of these challenges of paramount importance. Improving pupils' engagement and performance in social science requires the creation of highly successful treatments. Social science curricula may benefit greatly from the Brain Gym method. By making the classroom more interactive through physical activities, teachers can improve not only their students' academic performance but also their health, motivation to study, and overall sense of well-being. Teachers and students alike would benefit from a deeper understanding of these strategies' effectiveness in the classroom so that they can be more widely used.

Students gain the understanding and skills necessary to engage with the complexity of human society through social science education, an essential component of the academic program. Several academic disciplines are encompassed by it, including sociology, psychology, history, geography, economics, and politics. Students should be able to question assumptions, evaluate evidence, and understand multiple perspectives; this is the fundamental purpose of the social science curriculum (NCERT, 2021). This method of teaching not only helps students become more aware of social issues, but it also prepares them to participate actively in democratic processes and civic engagement. Beyond its obvious importance in preparing students to be productive members of society, social science education is crucial in fostering critical thinking and ethical behavior. Learners understand the interplay of local and global dynamics via investigation of historical, social, and cultural backgrounds. To effectively teach students about the world's many cultures and ways of thinking, social science curricula must emphasize empathy and respect for diversity. Students are more engaged and have a better grasp of social studies concepts when teachers use innovative methods like thematic learning, project-based learning, and cooperative learning. Strengthening the relevance and impact of the learning experience, these approaches encourage students to actively participate in their own education and work together.

III. RESEARCH QUESTIONS

The following research questions were developed based on the studies cited:

- How can apply Brain Gym strategy for teaching Social Science at secondary schools?
- Does the Brain Gym approach have a different impact on social science achievement than the activity-oriented method of teaching?
- Is there any significance difference in the effectiveness of the Brain Gym strategy on social science achievement between male and female secondary school students?

IV. NEED AND SIGNIFICANCE OF THE STUDY

The need for innovative pedagogical practices that boost pupil performance has increased in today's classrooms. Traditional methods of instruction often fail to captivate students, leading to diminished intrinsic motivation and poor performance in the classroom. By incorporating brain-enhancing exercises and activities into the learning process, the Brain Gym approach provides a workable alternative. According to (Jensen, 2005) and (Donnelly et al.,2016), these methods can improve academic performance by improving cognitive abilities like memory, attention, and problem-solving. Using secondary school students' social science classes as a case study, this research will look into how well the Brain Gym method works. The most compelling aspect of this study is its ability to connect theoretical concepts with real-world classroom

practices. There is a dearth of research into the specific ways in which bodily exercise enhances cognitive development across disciplines, particularly in the social sciences, despite the overwhelming body of evidence showing that exercise promotes better overall cognitive development. By looking at how participating in Brain Gym activities affected students' performance in social science classes, this study hopes to offer concrete findings which can inform educational practices and curriculum development. To maximize pupil participation and educational outcomes, it is crucial for educators to comprehend how brain-enhancing activities work.

Not only does this study focus on individual academic achievement, but it also addresses broader educational goals that align with the National Education Policy (NEP) 2020. The focus of NEP 2020 is not on rote memorization but on the cultivation of analytical and problem-solving skills. Through examining how Brain Gym affects cognitive abilities like memory, attention, and problem-solving techniques, this study intends to advance the creation of research-based teaching strategies that promote students' overall growth. Prior research has demonstrated encouraging outcomes on Brain Gym's beneficial effects on a variety of learning domains, such as enhanced reading and math proficiency. Additionally, this study aims to fill in any deficiencies in the body of knowledge regarding the application of Brain Gym in social science education. There is ample evidence to support its use in other fields, but less is known about its capacity to raise students' performance in the field of social sciences. The goal of the research in this area is to generate empirical data that can inform instructional strategies and bolster an all-encompassing educational philosophy that integrates physical and cognitive development. The findings align with the NEP 2020's focus on interdisciplinary and multidisciplinary learning, and educators and policymakers seeking to enhance educational outcomes in a variety of fields may find them helpful.

V. RESEARCH GAP

The lack of information on the effectiveness of Brain Gym activities in improving academic achievement, particularly in the area of social science education, is the study's research gap. Although numerous investigations have looked at the benefits of Brain Gym in terms of enhancing cognitive skills and learning outcomes in subjects like reading and math, there is a glaring lack of empirical research specifically addressing the program's effects on social science disciplines. Many questions remain unsolved despite the growing popularity of the Brain Gym method as a means to enhance academic performance, particularly in domains such as the social sciences. Researchers have found that exercise improves memory, attention, and other cognitive functions; however, the effects of exercise on the performance of students majoring in social science have received comparatively less scrutiny. Most recent studies have concentrated on subjects like mathematics, where Brain Gym treatments have shown promising results. However, such targeted research is noticeably lacking in the field of social science education. Brain Gym has mainly been studied for its broad benefits, which include improving students' cognitive abilities (memory, attention, etc.), reducing stress and anxiety, and increasing neural connections and neuroplasticity through physical and mental movement. All of these things matter for students' overall performance in school, but they don't address the question of how Brain Gym can improve students' performance in economics, history, geography, politics, and other social science classes. Because of this void, teachers don't have a solid understanding of how to successfully integrate movement-based strategies into social science courses. Furthermore, there is a lack of specific information regarding the efficacy of Brain Gym in educational contexts, although there is substantial evidence that it may improve cognitive abilities such as memory, attention, and problem-solving abilities. This leaves a gap in our knowledge of how to customize brain-enhancing exercises to raise student engagement and academic achievement in the social sciences. Although Brain Gym exercises have been shown to improve general cognitive function, there is little scientific data evaluating their direct effect on social science achievement.

Additionally, we need longitudinal studies to determine how effective Brain Gym programs are in the long run in terms of students' academic performance. Incorporating these strategies into regular teaching procedure may have long-term advantages, but most recent research has focused on immediate results. The effectiveness of Brain Gym as a learning tool depends on whether or not its benefits persist after brief assessments. Research on the potential effects of demography elements on the efficacy of Brain Gym methods in social science classes is lacking in the literature. These factors include students' age groups, males and females and learning styles. We can gain a better understanding of how to modify these strategies for different types of students if we keep these things in mind. This study attempts to close these important research gaps by methodically examining how well secondary school students' social science achievement is affected by the Brain Gym technique. By adopting rigorous approaches and concentrating on this particular topic, the research aims to offer insightful information that can guide curriculum design and educational practices.

VI. STATEMENT OF THE PROBLEM

Academic Achievement is critical component of student success particularly in subjects such as social science which require analytical thinking and comprehension. Despite the recognized importance of these skills, many secondary school students struggle to perform well academically, often due to inadequate cognitive engagement and motivation. Traditional teaching methods may not effectively address these challenges leading to a gap in students understanding and retention of material. Therefore, the present study addresses the necessity of looking into the **"**Effectiveness of brain gym strategy on achievement in social science among secondary school students."

VII.OPERATIONAL DEFINITION OF KEY TERMS

7.1 Effectiveness

When one variable's impact is conditional on another variable's existence or absenteeism, the study's effectiveness is defined as the result. How well an intervention, like the Brain Gym strategy, accomplishes its goals is what this term alludes to in this research.

7.2 Brain Gym Strategy

In this study, the Brain Gym strategy refers to the incorporation of specific brain-enhancing activities and physical exercises into the teaching-learning process, aimed at improving cognitive functions such as memory, attention, and overall academic performance in social sciences. These activities are designed to stimulate both hemispheres of the brain, promoting better integration and enhancing learning capabilities.

7.3 Achievement

Achievement refers to the measurable performance of students in educational settings, typically assessed through grades, test scores, and overall understanding of the curriculum. In this study, achievement will specifically focus on students' performance in social science subject, evaluated through assessments and examination.

Social Science: Social science encompasses a range of disciplines that study human society and social relationships, including subjects such as history, geography, economics, and political science. In the context of this study, social science achievement will be measured to assess the effectiveness of Brain Gym in enhancing students' understanding and performance in these areas.

7.4 Secondary School Students

Secondary school students are individuals enrolled in educational institutions that provide secondary education, typically ranging from ages 12 to 18. In this study the experiment was conducted among the 9th standard students who follows SCERT Kerala Syllabus.

VIII. RESEARCH QUESTIONS

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functions; however, the effects of exercise on the performance of students majoring in social science have received comparatively less scrutiny. Most recent studies have concentrated on subjects like mathematics, where Brain Gym treatments have shown promising results. However, such targeted research is noticeably lacking in the field of social science education. Brain Gym has mainly been studied for its broad benefits, which include improving students' cognitive abilities (memory, attention, etc.), reducing stress and anxiety, and increasing neural connections and neuroplasticity through physical and mental movement. All of these things matter for students' overall performance in school, but they don't address the question of how Brain Gym can improve students' performance in economics, history, geography, politics, and other social science classes. Because of this void, teachers don't have a solid understanding of how to successfully integrate movement-based strategies into social science courses. Furthermore, there is a lack of specific information regarding the efficacy of Brain Gym in educational contexts, although there is substantial evidence that it may improve cognitive abilities such as memory, attention, and problem-solving abilities. This leaves a gap in our knowledge of how to customize brain-enhancing exercises to raise student engagement and academic achievement in the social sciences. Although Brain Gym exercises have been shown to improve general cognitive function, there is little scientific data evaluating their direct effect on social science achievement.

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XII. OPERATIONAL DEFINITION OF KEY TERMS

12.1. Effectiveness:

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12.2. Brain Gym Strategy:

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12.3. Achievement:

Achievement refers to the measurable performance of students in educational settings, typically assessed through grades, test scores, and overall understanding of the curriculum. In this study, achievement will specifically focus on students' performance in social science subject, evaluated through assessments and examination.

12.4. Social Science:

Social science encompasses a range of disciplines that study human society and social relationships, including subjects such as history, geography, economics, and political science. In the context of this study, social science achievement will be measured to assess the effectiveness of Brain Gym in enhancing students' understanding and performance in these areas.

12.5. Secondary School Students:

Secondary school students are individuals enrolled in educational institutions that provide secondary education, typically ranging from ages 12 to 18. In this study the experiment was conducted among the 9th standard students who follows SCERT Kerala Syllabus.

XIII. VARIABLES OF THE STUDY

According to (Best, 2016), "the independent variables are the conditions or characteristics that the experimenter manipulates or controls in his/her attempt to ascertain their relationship to observed phenomena." Accordingly, an independent variable is one that the researcher manipulates or that is thought to be the source of the experiment. The experimenter has

direct control over it and can change it in any direction. In the research titled "Effectiveness of Brain Gym Strategy on Achievement in Social Science among Secondary School Students", Brain Gym Strategy and the Activity oriented method are the two independent variables. Achievement in Social Science is the dependent variable here; it is a measure of how well pupils in secondary school do academically in social science classes, as measured by their performance on standardized tests that test their knowledge and ability to retain it.

XIV. SCOPE OF THE STUDY

Researchers in the current investigation set out to determine whether the Brain Gym approach had any positive effect on students' performance in social science courses taken at the secondary school level. The program Brain Gym is known to include brain-enhancing exercises, and the approach used in this study was to incorporate these exercises with brain-enhancing activities that encouraged student engagement in the learning process. This strategy can help the students to learn more meaningful and effectively the concept in Social Science. The study would help the Social Science teachers to understand the effectiveness of Brain Gym strategy and the necessity of application of their new techniques in the teaching of Social Science. Educators and curriculum developers can use the results of the investigation to inform pedagogical decisions and improve student learning. To sum up, everyone involved in education is expecting that the study's findings will be really useful.

XV. OBJECTIVES OF THE STUDY

The objectives of the study are:

- To develop a Brain Gym approach for educating social science in the ninth grade.
- To determine whether the Brain Gym Strategy improves students' performance in social science courses taken at the secondary level.
- To find out the effectiveness of Activity Oriented Method of Instruction on Achievement in Social Science of Students at Secondary school Students.
- To compare the following aspects of Brain Gym Strategy's impact on the performance of pupils in social science classes at the secondary level: Acquiring, Recalling, Applying, and Experimenting
- Determine, with regard to the following factors, the efficacy of the activity-oriented method of instruction on the following aspects of social science achievement among secondary school education pupils: Acquiring, Recalling, Applying, and Experimenting
- To compare the efficacy of Brain Gym strategy on Achievement in Social Science of Secondary School pupils with Activity Oriented Method of Instruction on Achievement in Social Science of Secondary School pupils.
- In order to compare the impacts of the Brain Gym strategy and the Activity-Oriented Method of Instruction on the following aspects of social science achievement: remembering, understanding, applying, and analyzing, on secondary school pupils.

XVI. HYPOTHESES OF THE STUDY

The following are the working hypotheses of the investigation:

- The Achievement in Social Science of Secondary School pupils taught through Brain Gym strategy is significantly higher than that of those who taught through Activity -oriented method of teaching Social Science.
- The Achievement in Social Science of secondary school students taught through Brain Gym strategy is significantly higher than that of those who taught through the Activity-oriented method of teaching social science with respect to the following instructional objectives namely: Remembering, Understanding, Applying and Analysing.

XVII. METHODOLOGY

Quasi-Experimental method was selected for the present study. The design adopted was non-equivalent pre-test post-test control group design. The study was conducted on a sample of 70 students of standard IX of which 35 students from division B and 35 students from division C of St. Mary's HSS Vallakom, Kerala, India. One group was selected at random as Experimental group and other as the Control group. The tools and materials used were lesson transcripts based on Brain Gym strategy include from the Social Science text books of standard IX of Kerala state syllabus and an achievement test in Social Science. Same achievement test was given to both the groups as pre-test and post-test. The experimental group was taught through Brain Gym strategy include brain enhancing exercises and activities. The Control group was taught with lesson transcript based on the Activity-oriented method of teaching. When all these classes were over, the achievement test was administered to experimental and control group.
The Tools and Materials used in the study were:

- Lesson transcripts based on Brain Gym strategy, which include, Brain enhancing exercises and activities incorporated to the topic "Land grants and the Indian Society" and "Peninsular plateau where Indian History Slumbers" developed by the investigators.
- Lesson transcripts based on Activity-oriented method of teaching developed by the investigators.
- Achievement test in Social Science developed by the investigators.
  Ethical considerations were rigorously followed. Informed consent was obtained from students, parents, and school authorities before participation. Confidentiality was maintained by anonymizing student data, and participation was entirely voluntary, with the option to withdraw at any time. The intervention adhered to educational ethics guidelines,

ensuring non-invasive, age-appropriate activities. Additionally, students in the control group were provided access to the Brain Gym strategies after the study to ensure fairness in learning opportunities.

XVIII. STATISTICAL TECHNIQUES APPLIED

For this research, the descriptive statistics measures of normality such as Skewness and Kurtosis were used. Also, the investigator made a preliminary analysis of the data using measures of central tendency like Arithmetic Mean and Median, Mode and measures of dispersion like Standard Deviation. The following Inferential Statistics were used to draw inferences or conclusions from the data obtained through research.

- Paired t-test to find the significance of the difference between means of scores in each group.
- Independent t-test to find out the significance difference between groups subjected to the experiment and those under control.
- ANCOVA used in order to determine how well the Brain Gym Method works.

XIX. DELIMITATIONS OF THE STUDY

This study's delimitation signifies the precise limits and restrictions that determine its scope, guaranteeing a concentrated examination of the Brain Gym strategy's impact on social science achievement among pupils in secondary schools. Important delimitations of this research are outlined below:

- Time constraints meant that the study could only be conducted at one school, and the number of respondents were reduced to 35 students from two standard IX divisions.
- Time constraints meant that only 20 transcripts of lessons from two chapters of the standard IX social science textbook could be produced.
- The current classroom arrangement does not allow for selecting of one-to-one equated groups. Thus, for the experiment, two categories of unbroken groups were chosen.
- The researcher was unable to control for influence factors such as students' study habits, socioeconomic status, etc. The study intends to stay on track by clearly outlining these limitations; further research is needed to address more extensive applications and impacts, though.

XX. FINDINGS OF THE STUDY

- What follows is a summary of the most important results derived from the exam results:
- Impact of Brain Gym Techniques on Academic Performance in Social Science among Secondary School Pupils.

Conclusion 1: The Brain Gym Strategy effectively enhances achievement in Social Science among secondary school pupils. The conclusion is substantiated by the subsequent findings. The statistical significance test for the variations in pre-test and post-test means of scores in Achievement in Social Science for the Experimental group (paired t-test) was significant at the 0.05 level. (M1 pre-test mean = 11.3, M2 post-test = 43.4, t =50.3, for df = 1/34 $p<0.05$). The same has tabulated at Table1.

Table 1: Effect of Brain Gym Strategy on Achievement in Social Science of Secondary School Students

Group	Pre-test Mean (M1)	Post-test Mean (M2)	t-value	df	p-value
Experimental	11.3	43.4	50.3	1/34	<0.05

Conclusion 2: Brain Gym Strategy effective in enhancing Achievement in Social Science of Secondary School Students under the component -Remembering. The Conclusion is substantiated by the following findings.The statistical significance test for variations in pre-test and post-test means of scores on Achievement in Social Science under the component of Remembering of Experimental group (paired t-test) was significant at 0.05 level. (M1 pre-test mean = 3.89, M2 post-test = 12.03, t =27.5, for df = (1/34) $p<0.05$). The same has tabulated at Table 2.

Table 2: Effect of Brain Gym Strategy on Achievement in Social Science under the Component - Remembering

Group	Pre-test Mean (M1)	Post-test Mean (M2)	t-value	df	p-value
Experimental	3.89	12.03	27.5	1/34	<0.05

Conclusion 3: Brain Gym Strategy is effective in enhancing Achievement in Social Science of Secondary School Students under the component -Understanding. The Conclusion is substantiated by the following findings. The significance test for variations in pre-test and post-test means of scores on Achievement in Social Science under the component of Understanding of Experimental group (paired t-test) was significant at 0.05 level. (M1 pre-test mean = 3.63, M2 post-test = 13.29, t =28.0, for df = (1/34) $p<0.05$). The same has tabulated at Table 3.

Table 3: Effect of Brain Gym Strategy on Achievement in Social Science under the Component - Understanding

Group	Pre-test Mean (M1)	Post-test Mean (M2)	t-value	df	p-value
Experimental	3.63	13.29	28.0	1/34	<0.05

Conclusion 4: Brain Gym Strategy is effective in enhancing Achievement in Social Science of Secondary School Students under the component -Applying. The Conclusion is substantiated by the following findings. The significance test for variations in pre-test and post-test means of scores on Achievement in Social Science under the component of Applying of Experimental group (paired t-test) was significant at 0.05 level. (M1 pre-test mean = 2.91, M2 post- test = 11.54, t =29.7, for df = (1/34 p<0.05). The same has tabulated at Table 4.

Table 4 : Effect of Brain Gym Strategy on Achievement in Social Science under the Component - Applying

Group	Pre-test Mean (M1)	Post-test Mean (M2)	t-value	Df	p-value
Experimental	2.91	11.54	29.7	1/34	<0.05

Conclusion 5: Brain Gym Strategy is effective in enhancing Achievement in Social Science of Secondary School Students under the component -Analysing: The Conclusion is substantiated by the following findings. The significance test for variations in pre-test and post-test means of scores on Achievement in Social Science under the component of Analysing of Experimental group (paired t-test) was significant at 0.05 level. (M1 pre-test mean = 0.886, M2 post- test = 6.543, t =24.4, for df = (1/34) p< 0.05). Comparison of the Effectiveness of Brain Gym Strategy and Activity oriented method of instruction on Achievement in Social Science of Secondary School Students. The same has tabulated at Table 5.

Table 5: Effect of Brain Gym Strategy on Achievement in Social Science under the Component - Analysing

Group	Pre-test Mean (M1)	Post-test Mean (M2)	t-value	df	p-value
Experimental	0.886	6.543	24.4	1/34	<0.05

Conclusion 6: Brain Gym Strategy is more effective than the Activity Oriented Method of instruction on Achievement in Social Science of Secondary School Pupils. The conclusion is supported by the following findings. The Analysis of Co-Variance of the pre-test and post-test scores on Achievement in Social Science of students in Experiment and Control category showed that there was significant difference between their mean (F= 254.55, df =1/67; p<.001). The Experiment category is superior to the Control group.

20.1 Comparison of Effectiveness of Brain Gym Strategy over Activity Oriented Method of instruction on Achievement in Social Science under different categories of objectives:

- Component 1: Remembering: Conclusion 7:
  Teaching using Brain Gym Strategy is more effective than Activity Oriented Method Teaching on Achievement in Social Science under the objective- Remembering. The Analysis of Co-Variance of the pre-test and post-test scores on Achievement in Social Science under the component of Remembering of pupils in Experimental and Control groups showed that a significant disparity was observed between their means (F= 78.43, df=1/67; p<.001). The Experimental team outperforms the Control group.

- Component 2: Understanding: Conclusion 8:
  Teaching using Brain Gym Strategy is more effective than Activity Oriented Method of Instruction on Achievement in Social Science under the objective- Understanding. The Analysis of Co-Variance of the pre-test and post-test scores on Achievement in Social Science under the component of Understanding of students in Experimental and Control groups showed that there was significant difference between their mean (F= 44.51, df=1/67; p<.001). The Experiment category is superior to the Control group.

- Component 3: Applying: Conclusion 9:
  Teaching using Brain Gym Strategy is more effective than Activity Oriented Method of Instruction on Achievement in Social Science under the objective- Applying. The Analysis of Co-Variance of the pre-test and post-test scores on Achievement in Social Science under the component of Applying of students in Experimental and Control groups showed that there was significant difference between their mean (F= 145.45, df=1/67; p<.001). The Experimental category is superior to the Control group.

- Component 4: Analysing: Conclusion 10:
  Teaching using Brain Gym Strategy is more effective than Activity Oriented Method of Instruction on Achievement in Social Science under the objective- Analysing. The Analysis of Co-Variance of the pre-test and post-test scores on Achievement in Social Science under the component of Analysing of students in Experimental and Control groups showed that there was significant difference between their mean (F= 188.40, df=1/67; p<0.001). The Experimental category is superior to the Control group.

XXI. TENABILITY OF THE HYPOTHESIS

Hypothesis 1: The first hypothesis formulated is, “The Achievement in Social Science of Secondary School students taught through Brain Gym strategy is significantly higher than that of those who taught through Activity oriented method of teaching Social Science”. The above hypothesis is converted into null hypothesis for the purpose of statistical Inference. "There is no significant difference in Achievement in Social Science of Secondary School students taught through the Activity Oriented method of Instruction and those who taught through the Brain Gym Strategy," becomes the statistical hypothesis. After the experiment, students in the experimental group demonstrated a significantly higher level of Achievement in Social

Science compared to students in the control group, according to a test of significance test of variation between the mean post-test scores of the two groups (M experimental = 43.4, M control = 26.1, t = 15.5, p<.001). Therefore, the null hypothesis can be stated as: "There is no significant difference in Achievement in Social Science of Secondary School students taught through Brain Gym Strategy and those who taught through the Activity Oriented method of Instruction". The result of a significance test for variation between the mean post-test scores of students in both the groups (M experimental = 43.4, M control = 26.1, t = 15.5, p<.001) revealed that experimental group students have significantly higher level of Achievement in Social Science than the control group students after the experiment. To determine whether there was a statistically significant difference between the two groups, we compared both the experiment and control category's mean Achievement in Social Science gain scores. A statistically considerable variation is observed between the control and experimental groups with respect to the mean gain scores of the students. (Test = 15.4, p<.001), with a M gain of 32.1 and a M gain of 14.5 under control. There was a considerable variation between the means of the Experimental and Control groups when the Analysis of Co-Variance of the pre-test and post-test scores on Achievement in Social Science were compared (F= 254.55, df=1/67; p<.001). There is a significant difference between the Experiment and Control groupings. The findings from the research clearly show that, compared to students trained using the Activity-oriented method, those in secondary school who were taught using Strategy using Growth Mindset had substantially better Achievement in Social Science. So, we can say that the statistical hypothesis is not true. As a result, we accept hypothesis 1.

Hypothesis 2: With regard to the following learning outcomes-Remembering, Understanding, Applying, and Analyzing pupils in secondary schools whose social studies classes used the Brain Gym approach performed much better than those whose classes used the Activity-oriented approach. For the sake of mathematical inference, the previously stated hypothesis is transformed into the null hypothesis. Hence, we can put forward the null hypothesis as follows: Considering the following goals namely- Remembering, Understanding, Applying, and Analyzing- there is no statistically crucial distinction between the two approaches to teaching social science in secondary schools: The Brain Gym Strategy and the Activity Oriented method. The results of the significance test for the previous assumption are detailed below. Keep in mind: (F = 78.43, df = 1/67; p<.001). With this provision, we dismiss the null hypothesis. Gaining comprehension: (F = 44.51, df = 1/67; p<.001). With this provision, we dismiss the null hypothesis. (F = 145.45, df = 1/67; p<.001) was used. With this provision, we dismiss the null hypothesis. Looking at the data: (F = 188.40, df = 1/67; p<.001). With this provision, we dismiss the null hypothesis. Under the components of Remembering, Understanding, Applying, and Analyzing, the F value obtained from the Evaluation of Covariance of the scores obtained before and after the test of the experiment team is important. So, we can say that the null hypothesis is not true. Therefore, we accept hypothesis 2.

XXII. IMPLICATIONS OF THE STUDY

The findings of the study "Effectiveness of Brain Gym Strategy on Achievement in Social Science among Secondary School Students" have important ramifications for educators, parents, administrators and pupils in the realm of education. The Brain Gym method has the potential to significantly impact learning outcomes and personal growth because of its emphasis on bodily activity to improve cognitive functions. The significance of students participating in activities that enhance the way they feel physically and mentally has been emphasized by this research. Incorporating Brain Gym exercises into social science lessons can help students concentrate, remember information, and grasp complex ideas. By encouraging students to see learning as an ongoing process, this method improves their academic engagement and positivity toward schoolwork. The findings of this study can be used by educators to improve their teaching methods. Teachers can create an engaging classroom setting that encourages physical activity and cognitive growth by incorporating Brain Gym activities into the curriculum. In addition to helping students succeed in social science classes, these strategies promote their overall growth by making it easier for them to focus and lessen their anxiety. When it comes to their children's education, parents are indispensable. The importance of parents promoting physical exercise and the advantages of Brain Gym techniques at home is highlighted by this study. Parents can teach their children to love learning and improve their study habits by setting a good example themselves and encouraging a healthy lifestyle. The results highlight the need of integrating Brain Gym principles into school policies and curricula, which administrators should take into consideration. To help educators learn how to use these tactics in the classroom, professional development programs can be created. Executives should think about ways to evaluate students' progress in the classroom that take into consideration their academic performance as well as the positive effects of exercise on students' final grades.

Overall, this study emphasizes the transformative potential of integrating Brain Gym strategies into education. It requires a concerted effort from all parties involved students, educators, parents, and administrators to foster an atmosphere where physical activity boosts cognitive capacities, ultimately resulting in higher social science proficiency and equipping students to confidently and resiliently confront potential obstacles.

XXIII. RECOMMENDATIONS

The researcher noted that there are still a number of unanswered questions in light of the current research's limitations and results. Here are a few recommendations for subsequent studies:

- Researchers in the future can look at how Brain Gym techniques affect students' performance in social science over the long run. We can learn a lot about the initiatives' long-term effects on learning outcomes by tracking their impact as time goes on.
- Although the social sciences are the primary focus of this study, other fields of study, like math, science, or language arts, could benefit from the application of Brain Gym techniques. The method's generalizability could be better gauged with this information.

- Raising the age range of participants from elementary school to high school will allow us to compare the efficacy of Brain Gym techniques across different phases of development.
- Additional studies could examine how Brain Gym techniques affect learners from a variety of socioeconomic backgrounds, those with learning disabilities, and gifted children.
- If we want to know what kinds of professional development programs work, we should look at how teaching teachers Brain Gym principles affects their classroom practices and the results the pupils get. Better use of Brain Gym techniques in the classroom may be possible with the help of research into teachers' perspectives on the value of physical movement as a learning tool (see point 6).
- Investigating the role of parental support and reinforcement of Brain Gym principles at home could add another dimension to understanding the broader influences on students' learning experiences and outcomes.
- Research could examine how technology-based interventions, such as apps or online platforms that incorporate Brain Gym exercises, can complement classroom instructional strategies, particularly in social science.
- Conducting comparative studies to evaluate the effectiveness of Brain Gym strategies against other pedagogical approaches, such as inquiry-based learning or cooperative learning, could provide nuanced insights into best practices.
- To make the results more applicable to a global scale, it would be beneficial to study how cultural variables impact the use and success of Brain Gym techniques in various countries or regions.
- Further studies could look at how Brain Gym interventions influence students' mental health, social abilities, and outlook on learning and difficulties in general, not only their academic performance.

If these questions are adequately answered through subsequent investigations, we will have a better grasp of how to use Brain Gym techniques in social science classrooms to help students succeed academically and personally. This research in no way implies that the proposed course of action is exhaustive. Nonetheless, it's a top-notch method for teaching social studies in secondary schools that incorporates theories of brain-enhancing strategies. The Brain Gym Strategy, according to the investigator, will help advance social science education. On top of that, it will help clear the way for more educational research in the future.

XXIV. CONCLUSION

The research on the efficacy of the Brain Gym approach for improving social science performance among pupils in secondary schools has produced strong proof that highlights the necessity of incorporating creative educational techniques into educational practices. The results demonstrate that pupils utilizing the Brain Gym approach attained superior scores relative to their counterparts instructed through conventional activity-based methods, and exhibited notable enhancements across multiple cognitive domains, including recall, comprehension, application, and analysis. This indicates that integrating physical movement into learning can improve cognitive function and retention, resulting in a more dynamic and effective educational experience. Teachers must always keep in mind that students' physical and mental health have a significant impact on their learning. Educators are encouraged to embrace methods that promote full participation and holistic development, according to the outcomes of this study, which call for a fundamental change in teaching strategies. The importance of instructors establishing classroom settings that encourage physical exercise and intellectual development is further underscored by these results, which have ramifications beyond the performance of pupils in the classroom. Educators can create an educative atmosphere that boosts performance in school, decreases anxiety, and increases motivation by incorporating Brain Gym exercises into lesson plans. Students are more likely to have a positive outlook on their studies and participate fully in the educational program when they are encouraged to see learning as an active process through this method. Looking ahead, investigations examining the long-term effects of Brain Gym strategies on various subjects and levels of education are crucial. The long-term effects on educational achievement of these initiatives can tell us a lot about how well they work and whether they are sustainable. Further validation of Brain Gym strategies' potential as a versatile instructional approach can be achieved by investigating their applicability to diverse student populations, including those with varying learning needs. Ultimately, this study is a strong indication of how revolutionary new approaches to education, such as Brain Gym, can be. In order to help our learners succeed in school and in life, we should use these strategies to design engaging lessons that help them overcome obstacles in their academic pursuits while also encouraging them to keep growing and improving as individuals. Our students will be better prepared to adapt to a dynamic and unpredictable world if we work toward an educational system that places equal emphasis on academic success and personal growth.

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