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Structured and Unstructured Movement in Elementary School Classrooms: Effects on Student Performance

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By

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Introduction

Movement is a crucial factor in a healthy life. Research has shown the benefits of movement for adults and children alike. Not only are there physical benefits to movement, including physical fitness and health, there are also mental benefits. Movement is known to reduce symptoms of anxiety and depression, aid sleep, increase self-confidence and self-esteem, and boost brain function (Exercise for Stress and Anxiety, n.d.)

According to Lengel & Kuczala (2010), it is thought that the way we think, learn, and remember information can be influenced by the physical movement we do. Furthermore, specific, directed movement is believed to have a significant impact on learning because it helps prepare the brain for learning (Lengel & Kuczala, 2010). Lengel & Kuczala (2010) also states that using brain-compatible movements increases neural connections, which is said to improve learning. Learning new content through movement is beneficial. In a school context, teachers who incorporate movement increase students' understanding, retention, and their motivation to learn. Movement also improves students' social skills and in general, stimulates the brain/body connection (Lengel & Kuczala, 2010).

Lengel and Kuczala (2010) also list ten reasons why educators should use movement to improve learning. One of listed reasons is that movement allows for implicit learning. Implicit learning is learning that takes place beyond the conscious awareness. Another reason provided in the list is that movement improves brain function. Movement helps create an environment where new brain cells can grow and thrive (Lengel and Kuczala, 2010). According to Lengel and

Kuczala, "when movement is used to learn a concept, a unique environmental note is made by the brain making the information easier to recall… It is possible for the brain to create unique environmental pictures of learning, which can enhance students' ability to recall information later" (Lengel and Kuczala, 2010).

Study

In this study, student researchers Caitlyn Hinnerschitz, Jordan Johnson, and Savannah Watson, under the guidance of faculty advisor Dr. Richard Costner, sought to discover how movement impacts student performance on exit slips and assessments given during a unit of instruction.

Spring 2019

During the spring 2019 semester, three researchers were each placed in a fifth-grade classroom. The researchers created and taught four identical ELA lessons, using the college-wide ROPES format (i.e. review, overview, presentation, exercise, and summary). The study included to movement groups and a non-movement control group. Hinnerschitz led the structured movement group and directed her students through specific, yoga-like movements at three points: after the overview, after the exercise, and after the lesson summary. Another researcher (who has since left the study) supervised the unstructured group. She used a GoNoodle dance video asked students to get up and move with the video; however, she did not specifically require students to do so. This researcher also implemented movement three times during each lesson at the same points as the students in the structured group. The control group, led by Watson, offered no opportunity for movement throughout the lessons.

Fall 2019

The Fall 2019 study was conducted using an identical process as the Spring 2019 study. The major difference to be noted about the Fall study was the grade level used in this study differed from the previous study. In the Fall 2019 study, the researchers were placed in third grade classrooms. The researchers created and taught Social Studies lessons, again using the college-wide ROPES format (i.e. review, overview, presentation, exercise, and summary). Furthermore, the study again included two movement groups and a non-movement control group. Hinnerschitz led the structured movement group and directed her students through specific, yoga-like movements at three points: after the overview, after the exercise, and after the lesson summary. Another researcher, Jordan Johnson (who joined the study after the previous researcher left), supervised the unstructured group. She used a GoNoodle dance video asked students to get up and move with the video; however, she did not specifically require students to do so. This researcher also implemented movement three times during each lesson at the same points as the students in the structured group. The control group, led by Watson, offered no opportunity for movement throughout the lessons.

Results

Spring 2019

In the Spring of 2019, the results show interesting results. Consistently throughout each exit slip, the control no movement group scored the highest, followed by the structured movement group.

On all four exit slip scores, the no movement group performed better than the structured movement group and the unstructured movement group. On exit slip one, the no movement group scored 11.9% higher than the structured movement group and 4% higher than the unstructured movement group. On exit slip two, the no movement group performed 8.1% better than the structured movement group and 16% better than the unstructured movement group. On exit slip three, the no movement group scored 5.9% higher than the structured movement group and 31% higher than the unstructured movement group. On exit slip four, the no movement group performed 10.6% better than the structured movement group and 25% better than the unstructured movement group.

On three out of the four exit slip scores, the structured movement group performed better than the unstructured movement group. On exit slip two, the structured movement group scored 7.9% higher that the unstructured movement group. On exit slip three, the structured movement group scored 25.1% higher than the unstructured movement group. On exit slip four, the structured movement group scored 14.4% higher than the unstructured movement group.

Fall 2019

The results for the Fall of 2019 yield different observations from the spring. For example, on each exit slip, students in the no movement control group scored the lowest, whereas students in the structured movement scored significantly higher on two of the four exit slips compared to the no movement group, at times as much as a 27.4% difference.

On two of the four exit slip scores, the structured movement group performed better than the unstructured movement group. Specifically, on exit slip two, the structured movement group

earned scores 8.9% higher than the unstructured movement group. On exit slip three, the structured movement group earned scores 1.7% higher than the unstructured movement group. While these are not significant differences, it is important to note that there was a small difference between the structured movement group and the unstructured movement group.

On the pre-assessment, the unstructured movement group performed better than the structured movement group, scoring 20.32% higher. On the post-assessment, the unstructured movement group performed only slightly better than the structured movement group, scoring 5.82% higher.

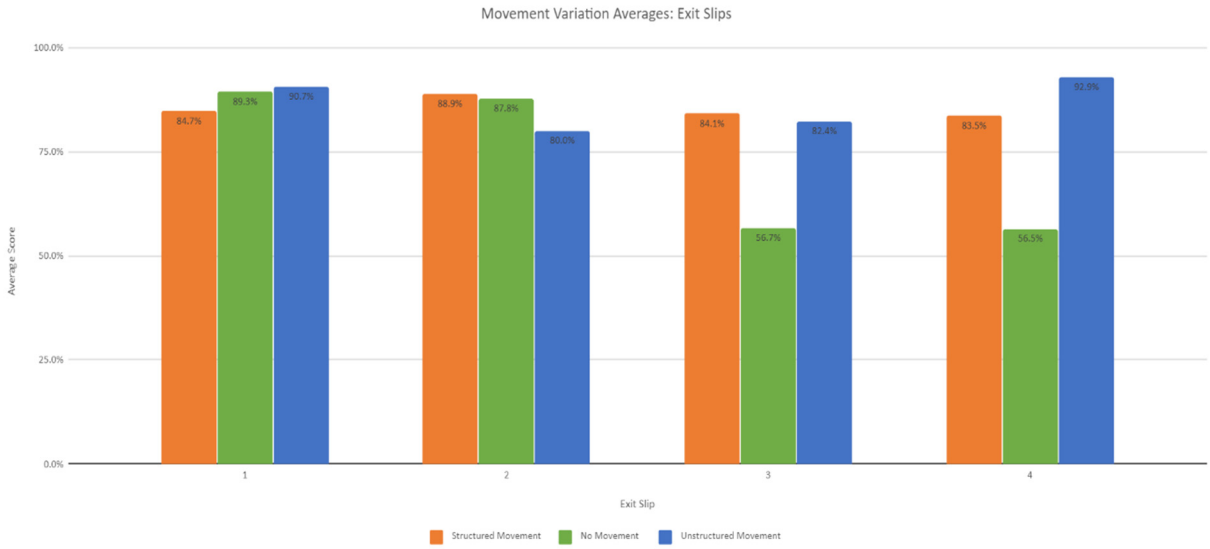
On three of the four exit slip scores, the structured movement group performed better than the no movement group. On exit slip two, the structured movement group scored only 1.1% higher than the no movement group. On exit slip three, the structured movement group scored 27.4% higher than the no movement group. On exit slip four, the structured movement group scored 27% higher than the no movement group.

On the pre-assessment, the structured movement group and the no movement group performed very similarly; the no movement group only scored 1% higher than the structured movement group. However, on the post-assessment, the structured movement group scored 22.22% higher than the no movement group.

On three of the four exit slips, the unstructured movement group performed better than the no movement group. On exit slip one, the unstructured movement group only scored 1.4% higher than the no movement group. On exit slip three, the unstructured movement group scored

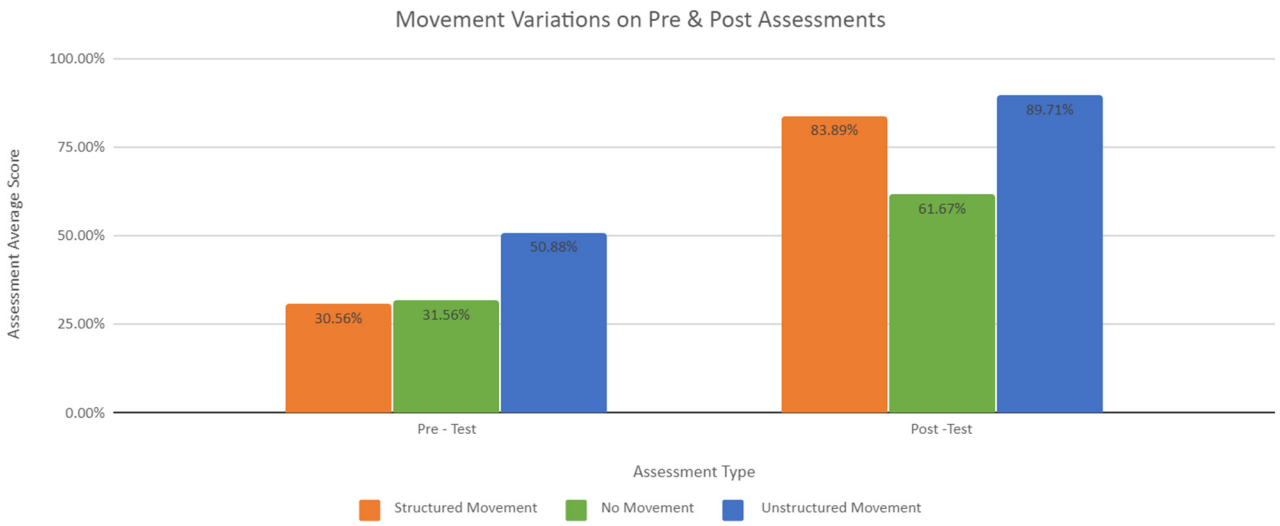
25.7% higher than the no movement group. On exit slip four, the unstructured group scored 36.4% higher than the no movement group.

On the pre-assessment, the unstructured movement group performed better than the no movement group, scoring 24.32% higher. On the post-assessment, the unstructured movement group scored 28.04% higher than the no movement group



The graph above shows the averages on four exit slips based on the type of movement. The x-axis represents the exit slips and the y-axis represents the average score of the exit slip. The structured movement group is represented in orange, the no movement group is represented in green, and the unstructured movement is represented in blue. The graph above clearly shows that the structured movement group (orange) scored higher than the no movement group (green) on exit slip three (by 27.4%), which is the greatest difference between these two groups. On exit slip four, the unstructured group (blue) scored 36.4% higher than the no movement group (green), which is the greatest difference between these two groups. On none of the exit slips does

the no movement group (green) outscore the unstructured movement group (blue), and on only one exit slip does the no movement group (green) outscore the structured movement group (orange).



The graph above shows the average scores on the pre- and post-assessments based on the variation of movement. The x-axis represents the assessment type and y-axis represents the average score of the assessment. As in the previous graph, the structured movement group is represented in orange, the no movement group is represented in green, and the unstructured movement is represented in blue. The structured movement group (orange) earned a 30.56% average on the pre-test and an 83.89% on the post-test. The no movement group (green) earned a 31.56% on the pre-test and a 61.67% on the post-test. The unstructured movement group (blue) earned a 50.88% on the pre-test and an 89.71% on the post-test. On the pre-assessment, the structured movement group (orange) and the no movement group (green) performed very similarly, with the no movement group (green) scoring only 1% higher. However, on the post-

assessment, the structured movement group (orange) scored 22.22% higher than the no movement group (green). On the pre-assessment, the unstructured movement group (blue) performed better than the no movement group (green), scoring 24.32% higher. On the post-assessment, the unstructured movement group (blue) scored 28.04% higher than the no movement group (green) and 5.82% higher than the structured movement group (orange).

Confounding Variables

There were a number of confounding variables that should be considered. First is the student absences. It is impossible to anticipate a student's absence, but it should be taken into account when analyzing the data. The structured movement group had a total of three absences during the administration of the four exit slips. The no movement group had a total of four absences during the administration of the four exit slips. The unstructured movement also had a total of four absences during the administration of the four exit slips.

Another confounding variable related to the structured movement group in that one student was physically unable to perform the movements due to an injury.

Arguably the most notable confounding variable is the different teaching styles and methods of each researcher. Each researcher is a different individual with a unique teaching style and method, which plays a significant role in students' acquisition of the content. There is no way to make the researchers' teaching styles or methods identical.

Implications

While this study suggests a correlation between movement and student achievement, further studies should be conducted; ideally a future study would standardize the procedures while limiting the variables from the original study. It cannot be concluded definitely that the movement alone resulted in the higher scores. However, movement does appears to have at least some impact on student performance on this specific set of exit slips and pre and post assessments. The data implies a correlation exists between movement and performance on students' both exit slips and pre and post assessments.

Resources

Exercise for Stress and Anxiety. (n.d.). Retrieved from https://adaa.org/living-with-anxiety/managing-anxiety/exercise-stress-and-anxiety

Lengel, T., & Kuczala, M. (Eds.) (2010). The kinesthetic classroom: Teaching and learning through movement. Thousand Oaks, CA: Corwin Press.