The Divergent Learning Journal
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Chris Burkett, Ed. D.
Doris G. Layton, Ph. D.
Randy Lee, Ed. D.
Columbia College

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SUBMISSION GUIDELINES

The Divergent Learning Journal is a peer-reviewed, scholarly journal based on the concepts of working with divergent learners. All submissions should relate to or share an emphasis on working with divergent learners.

A divergent learner is someone who:

- *is a person of average to exceptionally bright intelligence;*
- *does not easily relate to traditional curriculum, methods, school rules, and values;*
- *is no more likely to have learning disabilities than others; and*
- *experiences difficulty unless the school recognizes his/her innate personality traits and employs strategies to engage the divergent learner.*

*Recognizing the characteristics of divergent learners and knowing how to relate to these students is critical to teaching them effectively.*

Articles sent to the TDLJ for publication consideration must adhere to the following guidelines:

1). Articles must be applicable to divergent learners.

2). Submissions should be no longer than 3000 words in length.

3). Submissions must follow the American Psychological Association standards for publishing guidelines.

4). Articles should be submitted to Dr. Chris Burkett, TDLJ Co-Editor, as an attachment in Word format. Each article will be sent for peer review after the submission deadline has passed.

5). All submissions must be received by June 15, 2011 to be considered for the Fall 2011 issue.

Send articles to:
Dr. Chris Burkett
Columbia College
chrisburkett@columbiasc.edu
Contents

5 Editor’s Note
Chris Burkett, Doris G. Layton, Randy Lee

6 Effective Note Taking in Ninth Grade Biology
Ann R. Darr

15 Is There a Relationship Between Movement Activities in Second Grade and ELA Achievement?
Eve M. Dixon

24 Using Visual Activities to Improve Vocabulary Comprehension of 10th-Grade English Students
Gwen Roberson

31 The Effects of Using Learning Styles Inventories to Create More Effective Groups in Project Based Learning Activities
Robert Taylor

37 The Effects of Reading Strategies on Reading Comprehension of Fourth Graders
Shemia Thompson
Editors’ Note

Welcome to the inaugural issue of The Divergent Learning Journal. Divergent learners are those thinkers who resist traditional instructional methods. They are the “differently able” students who often possess complex reasoning patterns and continuously challenge the creativity and stamina of the educators who teach them. The articles in this issue illustrate how to effectively reach the divergent learners in our classrooms, as well as those students who learn traditionally.

For this issue of the journal, we wish to thank all of the authors who submitted their work for consideration, as well as to all the peer reviewers who volunteered their time to read submissions and provided insightful comments. Please consider submitting an article for the next issue. Information on the submission criteria is located on page 3.

Chris Burkett, Ed. D.
Doris G. Layton, Ph. D.
Randy Lee, Ed. D.
Co-Editors, The Divergent Learning Journal
Columbia College
Effective Note Taking in Ninth Grade Biology

Ann R. Darr
Columbia College

Abstract
This study examined the effect of note taking strategies on 9th graders’ academic performance. The sample of twenty 9th-grade students in a college preparatory biology class were taught 3 units of scientific method, ecology, and environmental science with no training in note taking followed by 3 units of chemical energy, cells, and mitosis with training in note taking. Students were introduced to content frame, Y diagram, Venn diagram, compare and contrast chart, concept maps, main idea web, power notes and the Cornell method. Word squares were used to build vocabulary in chemical energy, cells, and mitosis. The participants were assigned to 5 groups with 4 students in each group for the purpose of reprocessing their notes and helping each other review for quizzes and tests. Each group had students who were a blend of Below Basic level and Basic level. One group had an Advanced level participant. The results indicated that training in note taking strategies and group review had a positive effect on quiz scores from divergent, flexible, and traditional learners, and a slight increase in test scores from the divergent learners.

Note taking in ninth grade biology is essential for building comprehension and reviewing for tests. Many students experience difficulty in biology because they have not been properly trained by teachers in the various styles of note taking, which affects the quality of study notes and test scores. A synthesis of findings from studies on note taking, reprocessing notes, and teaching various note taking techniques suggested that the use of enhanced comprehension techniques resulted in higher test scores using various types of graphic organizers. Graphic organizers are widely used in science for organizing notes and projects as well as helping in problem solving, especially among students who perform below grade level. One type of graphic organizer used in biology is power notes. Power notes are a type of organizer used to help students prioritize their notes. Some are designed to go along with PowerPoint lectures. Another type of graphic organizer for learning vocabulary is word squares. This is done by writing the word, text definition, student’s definition, and a visual of the word on each square. To strengthen students’ reading comprehension, the Cornell method records information from text by folding a paper length wise and writing the main idea on the left side, then writing details pertaining to the main idea on the right side of the paper. Teaching students various types of note taking in biology will not only help improve their understanding of concepts, vocabulary, study skills, problem solving, and test scores, but will also “provide a more solid base for success in science courses at the college level” (Mackenzie, 2009, p. 6).

Research on guided note taking has yielded higher test scores among most undergraduate college students in applied psychology classes (Austin, Lee, & Carr, 2004). Guided notes are copies of the teacher’s notes or slides with missing information that require students to fill in the missing information. Guided notes help students “pay more attention to important details and less attention to trivial details presented in
lectures or textbooks” (Robinson, Beth, Odom, Hsieh, Vanderveen, & Katayama, 2006, p. 103).

Student test scores in ninth-grade world cultures classes were significantly higher when they were “shown how to take notes using the Cornell method” (Faber, Morris, & Lieberman, 2000, p. 264). This would also apply to other note-taking strategies that are used to enhance comprehension and retain information from text, such as graphic organizers and power notes. In addition, studies have shown that recall improves after taking lecture notes and reprocessing them in groups using concept mapping or other similar techniques (Hartley, 2002; Marzano, Pickering, & Pollock, 2001; Kobayashi, 2006). Studies suggest that graphic organizers are effective for learning difficult concepts (McCoy & Ketterlin-Geller, 2004; Robinson et al., 2006). Hoffman (2003) found improvements in comprehension by creating graphic organizers for students who are English for Speakers of Other Languages (ESOL). The ESOL students eventually created their own graphic organizers. One study found vee mapping to be effective for biology students. Biology students tend to have difficulty relating the concept being taught to the lab relating to the concept. One study described a technique used to connect both concept and lab work by using vee mapping. Vee mapping is similar to concept mapping, except vee mapping is used to make connections between what is going on in the lab and what has been discussed during class (Ugwu & Soyibo, 2004).

Although the aforementioned note-taking techniques seem to be beneficial in heightening achievement, it can only be accomplished by training students to use these different strategies (Austin et al., 2004; Faber et al., 2004; Hartley, 2002; Kobayashi, 2006; McCoy & Ketterlin-Geller, 2004; Mackenzie, 2009; Robinson et al., 2006). Biology texts contain complicated terminology, yet students’ limited background knowledge creates difficulties understanding the vocabulary. They have difficulty making the connection to the concept being taught.

This study addressed the following questions: (a) will using guided notes in addition to graphic organizers, such as concept mapping, and power notes, and the Cornell method, enhance comprehension and test scores among the students in ninth-grade biology?; and (b) will putting students into review groups for the last 10 minutes of class each day help create a learning community to assist in further understanding of vocabulary?

Method

Participants

The participants were 20 students in a high school college-prep biology course. These were students who had different levels of performance based on their 2008 Palmetto Achievement Challenge Test (PACT): (a) Below Basic level; (b) Basic level; (c) Advanced; or (d) Proficient. PACT is a means of assessing students’ achievement in the four core academic areas of English language arts (ELA), mathematics, science, and social studies. The class consisted of six males and 14 females. Two of the males and eight of the females were Caucasian. Three of the males and five of the females were African American. One male and one female were of Hispanic descent and were English proficient. The students’ interests included sports, television, movies, reading, and music, to name a few of the most cited interests. Based on the PACT scores, nine students scored Below Basic, 10 students scored Basic, and one student scored Advanced. One student
had an Individual Education Program (IEP), and only needed basic accommodations: (a) more time on tests and written assignments; (b) preferential seating; and (c) assistance in note taking.

**Instrumentation**

Materials used for this research included a Divergence Ranking Guide (Taylor & Johnson, 1999), which places students along a continuum from high divergent to highly traditional. Assessments included 12 teacher made quizzes with 10 multiple choice questions each, two quizzes per unit. Each unit test was teacher made and included 10 vocabulary matching, 25 multiple choice questions, and short answer questions.

**Procedure**

Students were given two quizzes and one test per unit for six units. Two weeks were spent on each unit. At the beginning of the semester each student completed a Divergence Ranking Guide.

For the first three units (scientific method, ecology, and environmental science), the students received partial PowerPoint notes to complete. Students were not given any other notes and had to use their PowerPoint notes as a study guide for quizzes and tests. The scores from these units were used as a baseline for comparison. For the next three units (chemical energy, cells, and mitosis), students were taught various methods of note taking and took notes for their reading assignments. The styles of notes to which the students were introduced were content frame, Y diagram, venn diagram, compare and contrast chart, concept maps, main idea web, power notes, and the Cornell method. Word squares were used to build vocabulary for each unit. During each unit, students were given complete PowerPoint notes. After a 10-minute lecture, students joined their assigned groups and reprocessed their PowerPoint notes onto a graphic organizer using power notes. Students were separated into five groups based on achievement test scores. Each group had at least one or two students who were more knowledgeable than the others in the group. The purpose was to create a learning community to help further the below basic students’ understanding. Each group had a notebook that was sectioned with each group member’s name. This is where they kept their power notes and concept maps. They created study guides for their tests. In addition to reprocessing their notes, they used their study guides to review and quiz each other. For reading assignments, the students used the Cornell method for taking notes from their textbook.

Class averages for quizzes and tests were compared for analysis. Observations were made and notes were taken by the researcher for student participation and comments about each group session.
Results
Figure 1. Comparative quiz averages from the 1st six weeks without training in note taking and 2nd six weeks with training in note taking and the overall point increase for all three groups.

Figure 1 shows the averages of students’ quizzes from the first six weeks and second six weeks and were compared by students’ PACT performance level. Since their training on note taking and group review, students with Below Basic level had a 24-point increase on quizzes, Basic ability level students had a nine-point increase on quizzes, and Advanced level students had a six-point increase on quizzes. The overall mean increase on quizzes was 13 points.
Figure 2. Comparative test averages from the 1st six weeks without training in note taking and 2nd six weeks with training in note taking and the overall point increase for all three groups.

Tests by PACT Scores

Figure 2 shows a comparison average of tests with and without training in note taking and group review. Since their training on note taking and group review, students with Below Basic level and students with Basic level had no increase on tests. Those with Advanced ability level had a three-point increase on tests.
Figure 3. Comparative quiz averages from the 1st six weeks without training in note taking and 2nd six weeks with training in note taking.

Quizzes by Divergent Ranking Scores

Quiz and test scores were also separated based on how students scored on the Divergence Ranking Guide. Figure 3 shows a comparative average of quizzes among the divergent, flexible, and traditional learners. The data shows an increase in scores with training in note taking and group review. The increase on quizzes was highest among the traditional learners with 25 points. The divergent and flexible learners had an increase of 15 points on quizzes.
Figure 4 shows a comparative average of tests among the divergent, flexible, and traditional learners. The data shows a two-point increase on test scores for the divergent learners. This was not a substantial increase, but higher compared to the flexible learners, who had a seven-point decrease on test scores, and traditional learners, who had a five-point decrease on test scores.

**Discussion**

The results of this study suggested that the use of completed guided notes, concept maps, and review groups increased students’ quiz scores. Although their test scores did not increase after the training in note taking, it may have helped keep the students’ scores from dropping. From my experience, when teaching chemical energy, cells, and mitosis, which deals with microbiology, students’ scores are generally lower due to unit difficulty. Therefore, having students use the aforementioned techniques may have prevented the students from having lower test scores during the second six weeks of the research.

Each group worked in collaboration on the reprocessing of their notes and reviewing for quizzes and tests. Quizzes were given on Tuesday and Thursday each week. Reprocessing their notes and reviewing in groups prior to each quiz substantially enhanced their quiz scores. The flexible and traditional students were students who were more knowledgeable than other students in their review group. Helping the divergent learners review for quizzes may have furthered their understanding of the specific concepts being learned.

Although the overall test scores did not show a substantial increase among the different ability levels, divergent learners had a slight increase on their test performance.
over the flexible and traditional learners. Processing small amounts of information for taking a quiz may have been easier than large amounts of information for a test.

**Limitations**

This research had limitations. Originally I was scheduled to teach two college preparatory biology classes. One would have been an experimental group, and the other would have served as a control group. Due to a change at the beginning of the semester, one college preparatory class was dropped and an AP biology class was added, preventing the use of a control group.

**Conclusions**

This study suggests that training in note taking and group review increases student performance. Teaching students how to reprocess their notes using various graphic organizers, such as power notes and concept maps, facilitated comprehension for students who were at the Below Basic and Basic levels. Group review was beneficial for most students for learning and social interactions. The results of this study may indicate a need for further research on the effects of study technique on performance outcomes. Moreover, this study would have benefited by comparing training in note taking on units of equal difficulty.

The results indicated that ninth-grade biology is not a simple course for freshman because of the terminology. It is important at the beginning of the school year to introduce different graphic organizers, concept maps, and ways to take notes from reading assignments to help further their understanding of biology. Guided notes, in addition to graphic organizers, such as concept mapping, power notes, and the Cornell method for reading assignments are all useful tools for learning biological concepts and vocabulary.

**References**


Is There a Relationship Between Movement Activities in Second Grade and ELA Achievement?

Eve M. Dixon
Columbia College

Abstract
Physical activity has many health benefits and research shows that there is a relationship between being physically fit and achieving academic success. In addition, brain research has shown that movement in the classroom is an integral part of learning and thinking. This study investigated the implementation of movement activities in a 2nd-grade classroom and its effect on English Language Arts (ELA) achievement. The study took place over a period of 12 weeks, 6 weeks without incorporating movement and 6 weeks with movement implementation. The participants involved in the study were 5 randomly selected 2nd-grade students. To assess the participants’ ELA achievement during movement implementation, the students’ DRA levels, Open Court Reading Assessments, and DIBELS scores were recorded and compared before and after movement implementation. The results of the study revealed no relationship between movement and ELA achievement. However, based on the literature review and best practice, movement should be implemented in the classroom due to its many brain and health benefits. Knowing these benefits, further research should be done to determine if movement activities can enhance ELA achievement in the classroom.

A nationwide emphasis on state standards and standardized tests in schools has led to the elimination of physical education classes and reduction in recess time. However, studies have shown a relationship between being physically fit and academic performance. These studies suggest that students who participate in physical activity perform better on standardized tests, have higher grade point averages, and are more physically fit. In addition to these findings, brain research has revealed many benefits related to physical activity that results in improved academic performance. However, few studies have been conducted to determine if incorporating movement activities in the classroom will positively affect academic achievement.

Participation in physical activity has been associated with many health benefits for people of all ages. Seventy-four percent of Americans do not meet the recommended guideline of at least 30 minutes of moderate to intense physical activity on a daily basis (Hillman, Erickson, & Kramer, 2008). When people participate in physical activities, they not only reduce their chances of developing health disorders, but also enhance their physical well-being by strengthening the muscles, heart, lungs, and bones (Jensen, 2005). Despite this knowledge, many school systems have significantly reduced or even eliminated their physical education classes and decreased scheduled recess times in an effort to increase students’ academic performance (Hruska & Clancy, 2008).

In addition to this concern, many children throughout the world have developed unhealthy lifestyles due to the decrease in physical activity and increase in time spent completing sedentary activities (Field, Diego, & Sanders, 2001). Children have become
more sedentary due to the development of computers and video game technology (Tremarche, Robinson, & Graham, 2007). With the above benefits and state standards in mind, many schools have started to incorporate movement activities into their daily curriculum (Hruska & Clancy, 2008). Through the implementation of movement activities, educators can begin to alter students’ unhealthy lifestyles while enhancing academic achievement.

Studies have shown a relationship between being physically fit and achieving academic success. The California Department of Education conducted a study to examine the relationship between high school students’ performance on the state-mandated physical fitness assessment and their SAT scores. The results showed that higher SAT scores were associated with increased levels of physical fitness (Blakemore, 2003).

Furthermore, a school in Massachusetts participated in a study that had similar outcomes. The researchers found a significant positive relationship between physical fitness and math and English academic achievement (Chomitz et al., 2009). Similarly, Martin and Chalmers (2007) conducted a study to enhance the argument for the widely known slogan “healthy children learn better.” The study revealed a distinct association between physical fitness and grade point average. In addition, Reynolds and Nicolson’s (2006) study revealed movement programs can lead to enhanced school and reading performance in children with reading difficulties such as dyslexia. The children completed various balance activities over a period of six months. After six months the students demonstrated improvements in reading precision, phonic skills, oral working memory, and behavior (Reynolds & Nicolson, 2006).

Brain research has also shown that movement is an integral part of learning and thinking. During movement, brain cells are invigorated, resulting in the growth of new brain cells and development of neural synapses (Blakemore, 2003). During physical activity, oxygen and blood flow to the brain are increased, which help to improve the speed of memory recall (Jensen, 2005). The implementation of movement can also increase student alertness, improve self-esteem, and increase higher-order thinking (Hruska & Clancy, 2008). Movement has also been linked to an improved attitude towards school (Jensen, 2005). This change in attitude has been linked to the heightened levels of endorphins experienced during movement. Increased endorphin levels can also improve mood, reduce stress, enhance emotional health, and promote calmness (Blakemore, 2003). Brain research has shown that there are many benefits to incorporating movement with learning.

Despite the lack of knowledge and research concerning the effect movement has on academic achievement, educators should actively engage students with a variety of movement activities such as Brain Gym, Tai Chi, yoga, singing, playing an instrument, dancing, skipping, twirling, and rough play. Engaging students in the above movement activities can keep students awake and alert during class because the brain is a pattern recognizing organ. In addition, movement patterns can help students learn and understand patterns in various subject areas, such as math and reading (Hannaford, 2005).

My study investigated the implementation of movement activities in a second grade classroom and its effect on English Language Arts (ELA) achievement. The research design incorporated movement activities over a period of 12 weeks, six weeks without movement and six weeks with movement. Based on the above cited research,
ELA achievement should increase during the six weeks of movement implementation. This outcome is expected due to prior research relating to physical activity, brain research resulting in enhanced brain cell development, and case studies revealing improved academic performance during movement implementation.

Methods

Participants

The setting for the study was a racially and economically diverse suburban elementary school in Columbia, South Carolina. The average per pupil expenditure for the school was $9,480, which was above the school district average. The class participating in the study consisted of 20 second grade students between the ages of seven and eight. Five of the twenty students were randomly selected to represent the class results for Developmental Reading Assessment (DRA), Dynamic Indicators of Basic Early Literacy Skills (DIBELS), and weekly basal reader assessments. Of the five selected participants, three were male and two were female. The race of the participants was three African American and two Caucasian. The students were generally of middle to lower socioeconomic status.

In addition, the Divergence Ranking Guide was used to determine each participant’s level of divergence. The Divergence Ranking Guide revealed that 2 of the 5 participants were classified as divergent learners because their scores were +3 or above. In addition, 3 students were identified as being traditional learners because their scores were -3 or below. No participants fell in the flex zone of -2 to +2.

Materials

Students participated in movement activities from the Brain Gym series developed by Paul and Gail Dennison. The Brain Gym energizers used during the study were selected from the books Hands On How to Use Brain Gym In the Classroom (Cohen & Goldsmith, 2002) and Making the Brain Body Connection (Promislow, 2005). Brain Gym movements were incorporated based on its well known academic benefits and brain research. During the study, the following Brain Gym movement activities were used: Brain Buttons™ (raise focus), The Thinking Cap™ (assist memory), Energy Yawn™ (increase oxygen to the brain), Hook Ups™ (stimulate learning), Positive Points™ (increase positivity), Lazy 8’s™ (enhance and improve eye muscular coordination), The Rainbow™ (raise relaxation and visual skills), The Owl™ (reduce shoulder and neck tension), Palming™ (reduce stress on the eyes), and Cross Laterals™ (activates communication between brain hemispheres). These movements were selected due to the perceived academic benefits. A detailed schedule of the Brain Gym movements used throughout the week can be found in Figure 1.

<table>
<thead>
<tr>
<th>Day</th>
<th>Brain Gym Movements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>Brain Buttons™, Thinking Cap™, Hook Ups™, and Cross Laterals™</td>
</tr>
<tr>
<td>Tuesday</td>
<td>The Owl™, Thinking Cap™, Hook Ups™, and Lazy 8’s™</td>
</tr>
<tr>
<td>Wednesday</td>
<td>The Rainbow™, Brain Buttons™, Hook Ups™, and Cross Laterals™</td>
</tr>
<tr>
<td>Thursday</td>
<td>Brain Buttons™, Positive Points™, Hook Ups™, and Cross Laterals™</td>
</tr>
<tr>
<td>Friday</td>
<td>Positive Points™, Palming™, and Cross Laterals™</td>
</tr>
</tbody>
</table>
Academic achievement in ELA was measured using DRA levels and DIBELS scores of five randomly selected participants before and after movement implementation. DRA is a reading assessment used to assist in determining a student’s reading level. DIBELS is a reading assessment used to monitor the development of early literacy and reading skills. DIBELS focuses on three main functions; Oral Reading Fluency (ORF), Retell Fluency (RTF), and Word Use Fluency (WUF). ORF is an individually administered, standardized test that assesses accuracy and fluency with a connected passage. The RTF assessment is intended to measure a student’s comprehension of a text. It also helps to increase the validity of the ORF. WUF is an individually administered assessment of vocabulary and oral language. Other materials used were the basal reader (Open Court Reading) comprehension assessments, daily student observations notes, a student survey, and the Divergence Ranking Guide.

The Divergence Ranking Guide, developed by Taylor and Johnson (1999), was used to assist in recognizing each participant’s level of divergence in the classroom. A divergent learner is recognized as an individual who does not relate to traditional curriculum, methods, school regulations, and/or values.

**Procedure**

To assess the students’ ELA achievement, five students were randomly selected from the class. The five students’ DRA reading level and DIBELS performance were assessed and recorded before beginning the 12 week study. During the first six weeks, participants received regular ELA instruction without movement. DRA and DIBELS performance were assessed and recorded. During the next six weeks, movement activities from Brain Gym were incorporated into ELA instruction. At the conclusion, the same five students were tested a third time using DRA and DIBELS assessments to determine if Brain Gym movements affected ELA achievement. The three assessments were compared to determine if changes occurred in ELA performance.

Detailed observation notes of the participants’ involvement and performance during ELA instruction were made to provide documentation of the students’ change in achievement. In addition, the five participants’ weekly grades on basal reader assessments were recorded to provide further documentation of ELA achievement. Each week a new basal story was read, and an assessment was given to evaluate each participant’s comprehension and basic knowledge of the story. The testing environment was controlled each week by ensuring the temperature, noise level, and other environmental factors were similar. In addition, the same Brain Gym movements were incorporated each week to provide a controlled schedule of movement activities (see Figure 1). To introduce Brain Gym to the participants, I explained the academic benefits and brain research correlated with Brain Gym movements. Furthermore, the selected Brain Gym movements were modeled and practiced with the participants to ensure correct formation of each movement activity. A booklet with pictures and detailed descriptions of selected Brain Gym movements were placed at each participant’s group table. These booklets helped to ensure students were using proper technique for each movement activity.
After collecting the data, I compared the five selected students’ DRA and DIBELS scores taken before and after movement implementation to determine the difference. I also compared all participants’ basal reader grades taken before and after movement implementation to determine if movement activities increased students’ performance on the basal reader assessments. By comparing the compiled data, I was able to observe the effect movement activities had on ELA achievement. In addition to the above data, I used the student survey and observation notes to determine the affect movement activities have on student behavior and daily performance.

Results

The first form of data used to assess the relationship between movement and ELA achievement was the DIBELS Reading Assessment. When looking at the DIBELS results, I focused on three functions of the assessment: Oral Reading Fluency (ORF), Retell Fluency (RTF), and Word Use Fluency (WUF). The DIBELS assessment results are shown in Tables 1-3. These tables display the difference in DIBELS scores during the control and the experimental period.

Table 1: DIBELS Results: Change in ORF Scores

<table>
<thead>
<tr>
<th>Learner Type</th>
<th>Student</th>
<th>Change in DIBELS Scores Beginning vs. Before Movement</th>
<th>Change in DIBELS Before Movement Scores vs. After Movement Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional</td>
<td>Student 1</td>
<td>- 22</td>
<td>+ 24</td>
</tr>
<tr>
<td>Traditional</td>
<td>Student 2</td>
<td>+ 17</td>
<td>- 1</td>
</tr>
<tr>
<td>Traditional</td>
<td>Student 3</td>
<td>+ 14</td>
<td>- 22</td>
</tr>
<tr>
<td>Divergent</td>
<td>Student 4</td>
<td>+ 2</td>
<td>+ 2</td>
</tr>
<tr>
<td>Divergent</td>
<td>Student 5</td>
<td>- 2</td>
<td>+ 3</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>1.8</td>
<td>3.6</td>
</tr>
</tbody>
</table>

Table 2: DIBELS Results: Change in RTF Scores

<table>
<thead>
<tr>
<th>Learner Type</th>
<th>Student</th>
<th>Change in DIBELS Scores Beginning vs. Before Movement</th>
<th>Change in DIBELS Before Movement Scores vs. After Movement Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional</td>
<td>Student 1</td>
<td>+ 13</td>
<td>+ 3</td>
</tr>
<tr>
<td>Traditional</td>
<td>Student 2</td>
<td>+ 18</td>
<td>+ 4</td>
</tr>
<tr>
<td>Traditional</td>
<td>Student 3</td>
<td>+ 15</td>
<td>- 36</td>
</tr>
<tr>
<td>Divergent</td>
<td>Student 4</td>
<td>- 6</td>
<td>+ 6</td>
</tr>
<tr>
<td>Divergent</td>
<td>Student 5</td>
<td>+ 5</td>
<td>- 7</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>9</td>
<td>- 6</td>
</tr>
</tbody>
</table>
Student 1 displayed an increase in RTF and WUF before movement implementation and an increase in ORF, RTF, and WUF after movement implementation. Student 2 exhibited an increase in ORF and RTF before movement and an increase in ORF, and RTF after movement was used. Student 3 demonstrated an increase in ORF and RTF before movement and an increase in ORF after movement implementation. Student 4 displayed an increase in ORF and WUF before movement and an increase in ORW and RTF after movement was employed. Student 5 exhibited an increase in RTF before movement and an increase in ORF after movement implementation. Overall, the DIBELS results were inconsistent.

In addition to the DIBELS data, I recorded the participants DRA reading level scores (see Table 4). Three participants’ DRA levels raised one reading level and one participant went up two reading levels before movement was applied. After implementing the selected movement activities, three participants’ DRA levels increased. The other two participants’ DRA levels remained the same.
To determine if movement affected ELA achievement, the students’ weekly reading assessments were used. The results showed a decrease in weekly reading assessment averages after movement was implemented into daily ELA instruction (Table 5). The students’ overall average decreased between 3-11% after movement implementation.

Table 5: Reading Assessment Results: Change in Average Test Scores

<table>
<thead>
<tr>
<th>Learner Type</th>
<th>Student</th>
<th>Average Test Score Before Movement</th>
<th>Average Test Score After Movement</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional</td>
<td>Student 1</td>
<td>98.3</td>
<td>95</td>
<td>-3.3</td>
</tr>
<tr>
<td>Traditional</td>
<td>Student 2</td>
<td>99</td>
<td>88.83</td>
<td>-10.17</td>
</tr>
<tr>
<td>Traditional</td>
<td>Student 3</td>
<td>98.83</td>
<td>93.83</td>
<td>-5</td>
</tr>
<tr>
<td>Divergent</td>
<td>Student 4</td>
<td>84.7</td>
<td>77.3</td>
<td>-7.3</td>
</tr>
<tr>
<td>Divergent</td>
<td>Student 5</td>
<td>96.7</td>
<td>91.83</td>
<td>-4.83</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>95.51</td>
<td>89.36</td>
<td>-6.12</td>
</tr>
</tbody>
</table>

For additional documentation, I took detailed observation notes throughout data collection. Upon reviewing my observation notes, I noticed some consistent patterns. The students were less talkative when movement was incorporated into ELA instruction. In addition to this finding, I noticed students were more focused during ELA instruction. This was noticed in the decrease of reprimands given to refocus students during ELA instruction.

To determine if movement affected the divergent learners differently than the traditional learners, I examined each student’s DIBELS, DRA, and reading assessments based on their level of divergence. After examining the data, I noticed that there was no pattern in either divergent or traditional learners (Tables 1-4). Furthermore, the reading assessment results showed that both traditional and divergent learners’ test scores decreased after implementing movement (see Table 5). In summary, the data did not suggest a positive or negative relationship between implementing movement and reading achievement for divergent learners.

The student survey revealed that the participants enjoyed the movement activities. Three of the five participants believed the movement activities helped them stay focused and believed the Brain Gym activities were fun. In addition, four students explained that the movement activities helped them do better on the reading assessments, and three students stated that the movement activities helped them stay focused during ELA transitions. The results of the survey showed that students liked the following Brain Gym movements the best: Brain Buttons™, Palming™, Positive Points™, and Hook Ups™. When asked why they enjoyed these Brain Gym movements the best, the students explained that the movements were “fun, energizing, healthy, and calming.”
Discussion

In this study, I examined the effect of movement activities like Brain Gym on ELA achievement in a second grade classroom. The participants’ DRA levels, DIBELS measurements, and reading assessment scores suggested that implementing movement activities during ELA instruction does not positively impact ELA achievement. The DIBELS scores were inconsistent and did not reveal a positive or negative relationship between movement implementation and ELA achievement. In addition, the participants reading assessment scores decreased during movement implementation, suggesting a negative relationship between movement and ELA achievement. Conversely, the DRA scores increased one reading level for most of the participants, which may imply that movement has a positive effect on ELA achievement. This inconsistency in data shows that the research needs further development and refinement.

The following limitations should be noted. First, this study only included five subjects. If this study were replicated, a larger sample of students in multiple grades should be included in the study. Second, the participants’ natural advancement in reading achievement should be taken into account. Throughout the year students will naturally progress in both their DRA reading level and DIBELS measurements. Third, the Open Court reading assessment data used to determine the participants’ ELA achievement may have not been the best measure to determine if movement affects reading achievement. The reading assessments get progressively difficult throughout the year as expectations and comprehension strategies become more complex. These limitations may have affected the results.

The survey and observation data revealed a positive relationship between movement and ELA achievement. The survey revealed that four of five participants enjoyed the Brain Gym movements. The participants commented that the movements allowed them to get them out of their seat and stay active throughout ELA instruction. In addition to the above comment, four of five participants agreed that the Brain Gym movements helped them do better on the reading assessments and remember ELA concepts. Similarly, the observation notes confirmed that participants were more focused and less talkative when movement activities were incorporated into ELA instruction.

In summary, no relationship between movement and ELA achievement was established. Although no relationship was found between movement and ELA achievement, movement still has many health and brain benefits and should be considered for implementation in the classroom. Knowing these benefits, further research should be done to determine if movement activities can enhance ELA achievement in the classroom.
References


Using Visual Activities to Improve Vocabulary Comprehension of 10th-Grade English Students

Gwen Roberson
Columbia College

Abstract
This study explored whether incorporating visual activities into vocabulary lessons increases students’ comprehension of vocabulary words. The twenty 10th-grade English students were a mix of visual, auditory, and tactile learning styles. The results indicated that the visual activities did have a positive impact on the students’ comprehension of the vocabulary words they were studying. There was a 12 point increase in the class’s vocabulary average.

In order for students to be successful learners, they must develop effective vocabulary comprehension strategies. Good vocabulary comprehension skills can help students achieve better reading comprehension. One of the main techniques good readers use is visualization. Onofrey and Theurer (2007) define visualization as the ability to create mental images and associations using background knowledge. They refer to visualization as a tool used to make sense of events shared orally and with texts. Vocabulary lessons have mostly consisted of students copying definitions and memorizing the words. Some researchers suggest that learning vocabulary is not something that needs to be done in isolation. Learning vocabulary words requires a variety of experiences with the words (Rose, 2004). Therefore, teaching vocabulary requires that teachers incorporate a variety of activities in their vocabulary lessons that will allow students to truly explore the meaning of the words. It might be effective if some of those activities include visuals so that students can visualize the meaning of the words and understand how they might fit in certain stories, topics, or conversations (Abram, 2008).

Visual images are one of the first things students learn to read. Students’ first reading experiences tend to be surrounded by picture books (Piro, 2002). Even at an early age students begin to learn how to decode visual images along with text. Literacy is not solely about written works. Literacy is “the ability to encode or decode meaning in any of the forms of representation used in the culture to convey or express meaning” (p. 128). By teaching students how to read artwork and photographs, they will be more equipped to comprehend written text as well. Interpretation is one of the major similarities in the process of reading artwork and an actual text. Interpretation also plays a major role in a student’s understanding of a vocabulary word. When students simply copy the teacher’s explanation or description of a term, their comprehension of the word lacks relevancy. Students need to generate their own explanation of the word; their explanations should come from their own life experiences or thoughts so that they will connect with the vocabulary words (Marzano, 2009). The elements of artwork convey meaning just as the elements of written text convey meaning (Piro, 2002). Both can offer a variety of perspectives and insights on different parts of a content area. Piro also
explores how using visuals can be used in connection with the reader-response theory (RRT). RRT requires the following: engaging the reader, entering the story, exploring the story, and evaluating the story. Teachers can use the same theory to get students to analyze artwork and photographs. By incorporating drawing in the curriculum, teachers will diversify their lessons, and students may gain a better understanding of the different vocabulary words. As students illustrate vocabulary words, they will gain a better understanding of the meaning of the word. When a teacher has students illustrate a word and write a sentence or short story that goes along with that word, the teacher is helping the students create a “dynamic format of image and word that delivers meaning and enjoyment” (Bucher & Manning, 2004, p. 67). Teachers might also find it beneficial to show students images they have found that illustrate the meaning of a word: This technique can be used as an introduction (Marzano, 2009).

Outside of getting students to draw and interpret various forms of artwork, teachers can also incorporate visual activities in their classroom by letting students express vocabulary words by using a digital camera to capture their meaning of the word. In O’Hanlon’s (2008) study, students were able to go beyond knowing the definition of a word; they were able to visualize new words and concepts through the pictures they took to represent the word. Students posted their images online, and their classmates were able to add notes to the image to expand the meaning. A similar activity and study was done with word walls. Harmon, Wood, Hedrick, Vintinner, and Willeford (2009) explored the use of word walls in middle and high schools. They decided to go beyond the normal word wall that just uses words. They had the students incorporate visual symbols and illustrations of the words. This gave students a visual with which to associate the words when it was time for them to recall the definition of the words. Students enjoyed having the visuals to go along with the words, and the study found that the visuals improved the students’ recall of the words.

Many teachers want their students to visualize, make inferences, determine importance, and synthesize. By incorporating visuals in the classroom, teachers can help their students perform those tasks as they read and study their vocabulary words. It is important for students to develop a sense of “word consciousness,” which is a fascination with new words that causes the students to explore and inquire about other words (Winters, 2009). Ritchhart and Perkins (2008) completed a study that suggests when students think through and with the contents they are studying, they will have a greater understanding of that content. Students can think through vocabulary words by making them visible. This article describes how a high school English teacher incorporated a variety of visual activities into her curriculum to try to improve her students’ understanding and prolonged remembrance of different vocabulary words.

Method

Participants

The study was conducted in a 10th-grade English College Preparatory classroom. The classroom had 20 students: 5 African-American females, 1 Hispanic female, 5 Caucasian females, 2 African-American males, 1 Hispanic male, and 6 Caucasian males. Spanish is the first language for the Hispanic female (ESOL Level 5).

Based on the results of the Divergence Ranking Guide, it is clear that there were a mixture of students in the study. Eleven of the students were traditional learners, and
eight of them were considered divergent learners. The Learning Styles Inventory results also provided information on the uniqueness of the students. Eight of the students were tactile learners. Those who were a mixture of different learning styles tended to be a mix with tactile learning. Five students were a mix of tactile learning and another learning style. Three of the students were a mix with the auditory learning style, and another three were a mix with the visual learning style. Only three of the students were considered to be primarily visual learners.

Procedure

For six weeks, the students were taught vocabulary as they were normally taught vocabulary. The teacher determined the words of the week (WOW) based on what the students would be reading in the class that week. Sometimes she would have them go through and select words that they found difficult. At other times she would already have a list of words she wanted them to study as they read a text. She would usually assign the students words to define or look for in their text as they read for homework. This teacher focused mostly on incorporating words that the students would be encountering and not just any vocabulary words. She would go over the words and provide the students with examples of how the words should be used in a sentence, and sometimes the students would do activities using the vocabulary words. Most of the teacher’s activities involved getting the students to look for context clues as a way of understanding the meaning of a word. They would have weekly activities that involved reading sentences, marking the context clues, and defining the vocabulary word in the sentence.

After the first six weeks, the teacher started to incorporate different visual vocabulary activities in the vocabulary lessons each week. For one lesson, she focused on getting the students to complete a word web on two words (conservative and liberal). The students focused on two presidential speeches they read in class. During another lesson, she had the students complete a word wall activity in which they illustrated the vocabulary word and wrote a sentence to go along with the picture. The teacher had the students present their work to the class on the Elmo projector. By getting the students to present their work and show it to the entire class, the students were able to get more examples of how to use the vocabulary words. One of the other visual activities the teacher incorporated in the class was a group activity in which the students were placed into teams and had to go to the board, write one of their vocabulary words from their reading, and draw an illustration to go along with the word. The students could not have two of the same words on their list, which forced them to remember all of the vocabulary words from their reading. The team that finished first was the winner. The winning team received extra credit points toward the next test. After the winning team was determined, the students had to define their word and explain their illustration to everyone. Finally, the last visual activity the teacher incorporated into her lessons was picture dictionaries. The students created a booklet of new words they learned while reading a novel. Each page of the booklet had to have the word, the word’s definition, a picture to illustrate the word, and a sentence that correctly used the word. In addition, the sentence had to be a caption for the picture. The students were able to use clipart or draw the pictures themselves. Afterwards, the students had a booklet they could use as a study tool to help them recall the words and better understand the meaning of the words.
A few weeks into the study, the teacher gave the students a Learning Style Inventory. The inventory focused on showing characteristics of auditory, visual, and tactile learners. The purpose of the inventory was to measure how many of the students were considered visual learners. To determine the number of students who were considered traditional, flex, or divergent learners, the teacher completed the Divergence Ranking Guide on the students in her class. She was given a chart in which she ranked the students and noted any comments that stood out as she was ranking the students.

Throughout the study, the teacher kept track of the students’ vocabulary grades. The students were tested on vocabulary words before they were introduced to the visual activities and while they were using the visual activities to learn their vocabulary words. After six weeks of not using the visual activities and six weeks of randomly incorporating the visual activities, the students were given a final vocabulary test. The final vocabulary test had words from the first and second six weeks. The purpose of the final test was to see how many of the students were able to define the words they learned using the visual activities compared to the words they learned without the visual activities during the first six weeks.

The final procedure was to ask the students if they found the visual activities to be helpful and an effective use of their time. As a class the students were asked to discuss the visual activities they took part in during the semester. This allowed the teacher to get an idea of what the students thought about the activities. In personal interviews, a girl and a boy were asked if they found having visuals helpful, which activity they enjoyed the most, what they liked the most about that activity, and what other activities they find helpful when trying to learn new vocabulary words.

Results

The overall class mean increased from 83 to 94. The mean grade of the traditional students increased from 87 to 95. The flex student’s mean grade increased from 73 to 90, and the mean grade of the divergent students increased from 85 to 94 (Table 1).

<table>
<thead>
<tr>
<th>Type of Student</th>
<th>Number of Students</th>
<th>Class Grade Average</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>20</td>
<td>83</td>
<td>95</td>
</tr>
<tr>
<td>Traditional</td>
<td>11</td>
<td>87</td>
<td>95</td>
</tr>
<tr>
<td>Flex</td>
<td>1</td>
<td>73</td>
<td>90</td>
</tr>
<tr>
<td>Divergent</td>
<td>8</td>
<td>85</td>
<td>94</td>
</tr>
</tbody>
</table>

After a review of the students’ thoughts on the visual activities, all 20 of the students felt that the activities offered a different way of learning the vocabulary words, which is what the majority of them considered most helpful. Fourteen of the students stated that they preferred doing the picture dictionary activity. Five of the students stated
that they preferred doing the word wall activity. The students who preferred the word wall and picture dictionary activities made the following comments about those activities: “They offer a visual and literary aspect to study; illustrated vocabulary words are easier to remember; it’s easier to understand it if I can see it.” One of the students preferred doing activities that just involved memorizing the definitions of the words. The student who preferred memorizing the words stated that he was good at memorizing things. He also stated that he thought the visual activities were a good idea, but he did not consider himself a good drawer; therefore, he did not really enjoy doing the activities. Half of the students stated that they enjoyed getting to draw an illustration of the words. The other half of the students stated that they were not good at drawing, so it was easier for them to find clipart or other pictures online to illustrate the vocabulary words. All of the students really liked having a visual they could associate with the word. Having a visual reminder triggered the recall of the meaning of the word when they had to take their vocabulary tests.

Other than providing their thoughts on the visual activities, the students made suggestions about other activities they found helpful when studying new vocabulary words. Some of the students said they enjoyed making flash cards, an activity that can incorporate visuals. The student who suggested the flash cards mentioned that he liked flash cards because they provided a helpful study tool. Another student stated that she enjoyed doing activities that allowed her to use her hands. She is one of the many tactile students in the class who benefit more from actually doing something to help them memorize the words. Whether it is acting the words out or creating some type of model or structure, the tactile learners need to be involved in some type of movement.

Another effect was that the teacher really enjoyed incorporating the visual activities in her classroom curriculum. She could tell the activities were helping the students because they would make comments like, “Ms. George, emaciated was the word I drew the skinny girl for, right?” The students actually thought back to their illustrations as a way of helping them recall the vocabulary words they had previously studied. Ms. George could see how the activities helped some of the students more than others. Some of the students were traditional students who were going to complete any assignment with ease whether they liked it or not. Then there were the other students who needed some type of motivation to actually enjoy working on any activity. For those students, the visual activities provided encouragement and did not come across as boring and inflexible. The teacher saw that the more divergent students liked doing activities that gave them the chance to be creative. The more traditional students were adaptive to the activities and seemed to enjoy taking part in the activities. It is also important to note that the teacher came to understand how relevant the vocabulary words were once students had to illustrate the words and create their own sentences to go along with the illustrations. It was as though the words came to life for the students.

**Discussion**

The results of this study reveal that incorporating visual activities into vocabulary lessons can have a positive effect on students learning the words. The students’ vocabulary grades had increased by the end of the semester. However, the study did not specifically prove whether or not traditional, flex, or divergent students benefited more.
Although the one flex student had the highest grade average increase, a true relationship cannot be established because it is only based on one student.

It is very important to note that a majority of the students enjoyed the variety of visual activities. Some of the students even stated that it made learning the vocabulary words more fun. Learning the words was not such a chore because they could be creative and find their own way of remembering the meaning of the words by creating their own illustrations. Although a majority of the students enjoyed the visual activities, a few of them stated that they didn’t really care for the activities because they were not good at drawing. Some students are not very artistic and find it challenging to complete activities that involving drawing. Teachers have to take note of the fact that some students will not care for or find the visual activities very helpful because they are not artistic and have a hard time connecting to the activities. Those students might actually find these activities to be a chore since they will struggle a little. Giving these students the option of utilizing clipart and pictures online might help make the activities less stressful. In fact, 17 of the students mentioned that they liked having the option of finding a picture if they couldn’t draw one for the picture dictionary activity. All of the five students who stated that they didn’t necessarily care for the visual activities were in the group of students who liked having the option of finding an illustration.

Another important factor in the results of this study is that learning vocabulary is not just about visual activities. In every classroom there tends to be different types of learners who have a variety of needs that need to be addressed. The students in this study were a mix of auditory, visual, and tactile learners. Many of them needed a mixture of stimulation in order for all of their needs to be met. Vocabulary can be taught by means of auditory, visual, and tactile activities. Incorporating all three would probably produce greater comprehension in students. Some students have to hear a word used in a sentence, see it written down as they hear it, and do something that makes them remember the meaning of the word.

The results of this study have actually brought up another major factor in how students best learn vocabulary words. In order to fully understand how students best learn vocabulary, a study needs to be done that utilizes a variety of activities that incorporate the main learning styles. A more comprehensive study of that nature will allow teachers to fully understand how to teach vocabulary and reach all of their students. There are a variety of ways to teach vocabulary, but finding the methods that work best are imperative to getting students to successfully learn vocabulary words and be able to recall their meaning over a period of time.

References


The Effects of Using Learning Styles Inventories to Create More Effective Groups in Project Based Learning Activities

Robert Taylor
Columbia College

Abstract
This study concentrated on the use of learning styles inventories in establishing more effective groups during group learning activities. Students were administered a VARK online learning assessment tool (Fleming & Bonwell, 2006). Through this tool students were identified as one of four types: visual, auditory, read/write, and kinesthetic. Students were then grouped into three study groups. One group was assigned students of similar styles. Visual learners were paired with visual learners, while the other study group was assigned by complementary styles. Visual learners were placed with kinesthetic learners. The last group was a control group, and they were allowed to choose their own partners. Students were observed as they worked within their groups, noting the level of engagement each group exhibited. Group effectiveness of assignments was concluded from these observations. Students were also surveyed to determine the effectiveness of the groups. The study found that the assigned groups performed better, and the groups were off task less on the assigned project.

Group projects or collaborative learning activities provide many benefits to students over traditional classroom activities. Collaborative learning helps students use knowledge that others bring to the group to build a larger base of knowledge. Grouping students together for projects and assignments is becoming a more common practice in classrooms. Group problem solving adds an additional benefit of students learning life skills such as team work, effective communication, accepting individual differences, appreciation for other people’s ideas, and teaching students to accept constructive criticism and resolving conflicts within a group. This study looks at using learning styles inventories to develop more effective groups.

Working in groups can combine several individual ideas together to come up with innovative and exciting designs. Using personality trait indicators such as Myers Briggs can help members of the group understand each other better and use the group’s strengths to complete a given task more effectively. A study by Wethayanugoon (1994) used the Myers Briggs Type Indicator to create groups for faculties in elementary and secondary schools in Thailand. He found that when groups understand each others’ strengths and weaknesses, it helped them assign tasks that were more closely fit to their personality.

For years now, the value of cooperative learning has been recognized as an effective tool to help students retain knowledge, work together, and communicate effectively within a group. Huss (2006) categorized the effects into five distinct categories. The effects that he noted were positive interdependence, face-to-face interaction, individual and group accountability, interpersonal skills, and group processing. Willis (2007) pointed out that group work can help students as they are going through adolescence. The group setting allows students to discuss answers within their group, giving them a chance to express views without the threat of being embarrassed by
Ko, Wang, Tan, Liu, and Ee (2009) studied a group of students and teachers to try to decide if group projects could help lower achieving students become more successful. Students and teachers agreed that group projects help students gain valuable life skills but the groups differed on the effectiveness of group work when it came to actually learning the material.

In a study by Varvel, Adams, Pridie and Ulloa (2004) engineering students were administered the M.B.T.I in order to establish teams that the students would work with during the semester. The information gained from the survey helped members of the group better understand each other’s differences, and members gained a better tolerance toward each other’s differences. Groups work better when they understand each other more thoroughly. In a study by Huxham and Ray (2000), groups were assigned according to their personality in an effort to make the groups more productive from the start. This study found that it made no difference and students responded that they would prefer to choose their own groups. It appears that the use of personality trait indicators do little in increasing the productivity of the group, but they do, however, help the group accept each other and become more comfortable with the differences within the group. This was again reinforced by Riceout and Richardson (1989) in a study that used the M.B.T.I. to develop a team building model that would help members appreciate the differences within their groups. If members appreciate differences and develop respect for each other’s differences, then it will help each member of the team feel as if their ideas matter and that they are important. Personality traits are an important factor in the development of a strong team.

It is commonly recognized that students and people in general have different personalities and that no two people are exactly alike. A learning styles inventory is a valuable tool for teachers to recognize those differences and teach to the students’ strengths. Slack and Norwich (2007) found in their study of nineteen 7-10 year olds that when you match the teaching style to the learning style that it makes a significant difference in the students’ retention of the information. Smith and Renzulli (1984) found that matching learning styles to teaching styles does have a positive effect on learning and achievement. Furthermore, Joyce and Hodges (1966) suggested that “a teacher who can purposefully exhibit a wide range of teaching styles is potentially able to accomplish more than a teacher whose repertoire is relatively limited” (p. 6). Hargrove, Wheatland, Ding, and Brown (2008) administered the Kolb Learning Style Inventory survey to students enrolled at Morgan State University to better understand how their students learn best. By using data like this, professors and teachers will be more capable of helping the students decide on the field of Engineering that best suits their learning styles, as well as help professors better understand their students and how they process information.

Method

The participants for this study were a group of 75 students enrolled in introductory pre-engineering class at a suburban high school in South Carolina. Students in this school are predominately middle to upper class socioeconomically. The study involved three classes of 25 students varying in ages and grades 9-12. All three classes were administered the learning styles inventory and data was collected. One class was used as a control group, and two classes were used for the study. In the control group, students were allowed to create their own groups for an assigned group learning activity.
In the study groups students were assigned partners according to their learning style preferences.

The class studied was an introductory pre-engineering course consisting of predominately white males. Study group A consisted of 20 males and 5 females. Study group B consisted of 6 females and 19males. One female in group B was considered a minority. She was the only minority in the study. The final group, group C consisted of 23 males and 2females. Study groups were chosen due to the number of females in the classes.

In study group A, the instructor paired students who were on opposite ends of the learning style spectrum. In doing this, the researcher hoped to find that students of differing learning style preferences would complement each other, and students would use each other’s strengths to create a more effective solution to the problem. In study group B, students were paired with students of similar learning styles.

To document findings, the researcher used three methods of measurement. The first method was developing a rubric that would accurately evaluate the final group project. The second method used was instructor observation. Students were observed during the development of the project while in their groups. The instructor evaluated each group on the level of student engagement observed. The final method of evaluation was to determine the success of the groups through how the students felt about their groups. To document this, students were administered a survey at the conclusion of the project to rate their feelings about the effectiveness of the way the groups were designed.

The school in which this study occurred is set up on an A/B block schedule format. Students met every other day for 90 minutes. The project the groups were involved in was to create a PowerPoint presentation designed to explain the progress that an everyday product of the student’s choosing made throughout its lifecycle. Students were administered an online Learning Styles Inventory and given their results. The instructor explained what the results revealed about their learning style preferences and introduced the PowerPoint Project. The instructor used the data to create the groups in the two study groups prior to the next class meeting. At the beginning of the next class meeting, groups were established and students began researching a product of their choice. Students were given one more class period to research and develop their PowerPoint and prepare for their presentation.

During the two blocks in which the students were working on their project, the teacher observed each group, noting the level of engagement observed on the project. This information was documented and compared Study Groups A and B, as well as the control group C, which selected their own groups. Students were evaluated during their presentation using a rubric designed for the project that evaluated the level of research students exhibited. Students were also evaluated on their ability to present the PowerPoint to the class. The instructor noted the level of preparation the group exhibited in the presentations. Again this information was compared across the groups. After gathering, compiling, and evaluating all data, the results of the survey were recorded.
Results

To determine the success of the study student PowerPoints were graded using a rubric designed for presentations. Each project was graded on content, organization, quality, theme, pictures, and their bibliography. Group A in the study had the students who were assigned with students of similar learning preferences. This group scored an average of 93% on their PowerPoints. The highest score obtained was 100%, while the lowest score in this group was 83%. Group B was organized into subgroups that had learning styles that complemented each other. Students who preferred to learn visually were partnered with students who preferred to learn kinesthetically, for example. This group scored the highest of all three groups with an average score of 97%, and the lowest score posted in this group was 88%. The final group in the study was Group C; they were the control group and chose their own partners for the project. Students in this group scored an average of 90% on their projects. This group still produced some high results with two of the sub groups scoring 100%. The lowest score for this group of students was 70%.

The groups were also observed during the two day work period and teacher notes were taken regarding student engagement and behavior, taking into account that student behavior is going to be lively during a group project. During observations of Group A, students in two of the subgroups were identified as off task. Groups quickly got back on task when asked to do so. There were no behavior issues during the two work days of the project. During observations of Group B, students in four of the subgroups were identified as off task. There were no behavior issues during the two work days of the project. During observations of Group C, only one group was identified as off task during the observations, and no behavior issues were addressed.

The final means of validating the study were to determine how the students felt about the groups, and this was done through a survey. Students were given four options from strongly agreeing to strongly disagreeing with 10 statements about the group and how it worked on the project. The survey indicated that 90% of the students involved enjoyed working in groups in general. Seventy-five% of the students enjoyed working in the groups in which they were assigned; 65% of the students indicated that they would like to work with their assigned partners in the future. Other notable findings were that 70% found the experience enjoyable. Groups also indicated that they found their groups to be an effective way to get a project done. Only 10% found that their input was not valued. Students however did indicate in a separate question that they did value their partners input. One hundred percent reported value in their partners’ input.

Discussion

The study does appear to find that, in this instance, using learning styles to create groups helped not only with student output, but also with student engagement. Willis (2007) concluded in his study that classrooms that incorporate cooperative work are more enjoyable settings for students to learn and often times less difficult to manage. Students in the study enjoyed working with each other and enjoyed receiving input from their partners, as well as giving input themselves to the project. There were no discipline problems, although there were the few instances of student disengagement. Students readily became reengaged with a little encouragement. As far as the value of effective groups, Ko, Wang, Tan, Liu, and Ee (2009) found that students valued the opportunity to
work with other students and to be able to interact socially, collaborate, and communicate ideas. The students in this study also indicated at a 90% rate that they enjoyed collaborating on the given assignment. Group work allows students to use the social skills that are so necessary in today’s workforce. Students who were assigned groups according to their learning styles, whether they were paired by similar learning styles or by complementary learning styles, appear to have worked the best together.

This study was conducted on a group of pre-engineering students, the majority of whom were highly driven. Students came from the same socioeconomic class and had similar interests. This may have had something to do with the outcome, but it was reassuring to know that there is a possibility to increase student output on group projects by grouping them with a learning style inventory. Assigning groups will also give students the opportunity to work on social skills that will be valuable to them in their future. It does not matter where they go to work, they will eventually be in an unfamiliar group; practicing group social skills will be valuable.

This study looked at using learning styles inventories for group projects exclusively. Although the study looked at group settings, the use of learning styles inventories could be used by all teachers to gain a better understanding of their students. Learning styles inventories are readily available in many different types of media. The study used an online inventory which is quickly scored and easy to interpret. Each student’s results were recorded in the instructor’s grade book so they could be easily accessed at anytime. It is hard to dispute the value of a teacher knowing more about their students than they can gain through normally administered assessments. A teacher who knows how each student in his/her class learns should be better prepared to help each student succeed. This information could prove valuable to future teachers of the student, as well as parents and the student themselves.

References


The Effects of Reading Strategies on Reading Comprehension of Fourth Graders

Shemia Thompson
Columbia College

Abstract
This article examines the effects the implementation of reading strategy instruction has on reading comprehension skills. Fourth grade students received traditional instruction for 1 nine-week language arts unit and reading strategies instruction during a second 9-week language arts unit. The students were given weekly reading comprehension quizzes in which the scores received before the implementation of reading strategy instruction and after the implementation of reading strategy instruction were compared. The data showed no significant differences between the grades of traditional teaching methods of reading and reading strategies teaching methods. However, the parent survey indicated parent observations of changes in the reading behavior of the students and the strategies that they used to better comprehend their reading.

Introduction
To bring children and books together successfully, children have to experience the pleasures of reading. Children have to hear stories, make predictions, visualize characters, imagine story settings, emotionally respond to characters, and think with new information. Teaching numerous reading strategies offers students the opportunity to become stronger independent readers and helps them bond with books through understanding. Educators must realize that they must give students helpful support by teaching them reading strategies to nudge them to become lifelong readers.

Good reading strategies help children to read in a more effective way. When using reading strategies, students will aim to get the maximum benefit from their reading with minimum effort. Once a student has a good understanding of a variety of reading strategies to use, the skill becomes natural to them and aids in their complete understanding of a text. For example, where students may only need the shallowest knowledge of a subject, they can skim material and only look at the chapter headings, introductions, or summaries to understand the text. Some examples of other reading strategies that can be used by students are: SQ3R, picking out key points, skimming, scanning, or studying their reading. By using reading strategies like these, students are establishing a greater understanding and appreciation of the reading material. Also, students are receiving the opportunity to engage their minds in active thought processes and they are developing critical thinking skills.

The purpose of this study was to examine the effect of teaching reading strategies on the reading comprehension of fourth graders. The simple conclusion from written works is that strategy instruction improves comprehension. It appears that reading strategies do not build reading skills, but indirectly improve comprehension. Teaching reading strategies is a low-cost way to give developing readers a boost, but it should be a small part of a teacher’s job. Happily, students can learn reading strategies quickly and they are effective, but they can sometimes appear to deliver a one-time boost. However, helping the students to acquire a broad vocabulary and a rich base of background knowledge will yield long-term benefits. This knowledge can be a product of constant
exposures to high quality books, films, book conversations, and so on, thus leading students to enhance their understanding of books through the use of reading strategies. The major question explored and answered in this study was: What effect will the implementation of reading strategy instruction have on reading comprehension?

**Literature Review**

Some teachers may assume that reading comprehension will develop naturally without any direct teaching of comprehension (Denton & Fletcher, as cited in Boulware-Gooden, Carreker, Thornhill, & Joshi, 2007). Research over the last 20 years has shown that children need instruction on phonological awareness, phonemic awareness, awareness of print, phonics, and fluency in order to improve comprehension (Boulware-Gooden, Carreker, Thornhill, & Joshi, 2007). Student comprehension is not enhanced merely by reading more text, but it is enhanced by educators teaching their students effective reading strategies to use during their reading. If the students used even one of the strategies, for example summarizing, comprehension was improved (Boulware-Gooden, Carreker, Thornhill, & Joshi, 2007). If students were given a host of strategies that they could apply at their discretion, comprehension was greatly improved.

In one study, the effectiveness of content instruction and strategies instruction was measured. The results indicated that there were no extreme differences in student performance based on the instruction that was received (McKeown, Beck, & Black, 2009). Researchers reported that more precise understandings at present-day comprehension instruction through the implementation of the strategies approach were needed. Given that comprehension is such a complex cognitive endeavor and is affected by the reader, the text, and the context, comprehension research has considered many features as contributing to student outcomes, such as the use of strategies (McKeown, Beck, & Black, 2009).

Another study was conducted that examined the instructional effectiveness of different reading strategies for students identified as processing different learning styles (Hsieh & Dwyer, 2009). The results of the study showed that not all types of reading strategies are equally effective in facilitating different types of learning objectives (Hsieh & Dwyer, 2009). Many students found reading strategies useful when implemented before, during, or after reading (Brown, 2002; Ediger, 2005; Fagan, 2003; McGlinchey & Hixson, 2004; Mills & King, 2001; Sorrell, 1996; as cited in Hsieh & Dwyer, 2009). Some examples of these reading strategies are rereading, scanning, summarizing, keywords, context clues, question-answer relationships, inferring, thinking aloud, activating prior knowledge, setting a purpose, and drawing conclusions. However, the effects of implementing reading strategies are not always equally effective methods in facilitating reading comprehension (Baumann et al, 2002; Ediger, 2005; McGlinchey & Hixson, 2004, as cited in Hsieh & Dwyer, 2009). Some researchers found significant effects on reading comprehension, such as employing keyword strategies before reading (Hsieh & Dwyer, 2009). In summary, many educators can encourage students to be aware of their own strengths in varied learning situations. A continued focus on exploring varied ways of using reading strategies for different learners will enhance reading performance results (Hsieh & Dwyer, 2009).

Small-group, peer-led literature discussion groups can accomplish a range of goals (Berne & Clark, 2008). Peer-led literature discussions can contribute significantly
to students’ knowledge and appreciation of literature, thus improving their comprehension skills. Students are able to develop their understanding of comprehension strategies when participating in these forums. The students share the strategies they used to construct meaning during reading, and those they are using as they talk during the discussions. In addition, a student’s thinking can serve as a cognitive model in the use of comprehension processes for their fellow students (Berne & Clark, 2008).

Teaching students to engage in this thinking process requires teacher scaffolding, where the executing of comprehension strategies are gradually released from the teacher to the student (Dewitz, Jones, & Leahy, 2009). Educators expect that after teaching reading strategies that the students will assume more and more responsibility for the use of these strategies when reading. Stimulating tasks increases a student’s interest in reading. Teachers should provide guidance for reading to satisfy curiosities aroused from the tasks (Guthrie, Wigfield, Humenick, Perencevich, Taboada, & Barbosa, 2006). Students with a high number of stimulating tasks increased their reading comprehension (Guthrie, Wigfield, Humenick, Perencevich, Taboada, & Barbosa, 2006). Stimulating tasks in reading increased interest, which increased longer term intrinsic motivation and reading comprehension (Guthrie, Wigfield, Humenick, Perencevich, Taboada, & Barbosa, 2006). To achieve growth in student reading skills and ensure later school success, teachers must provide all students with appropriately challenging instructional materials and tasks (Reis, Eckert, McCoach, Jacobs, & Coyne, 2008).

Reading comprehension strategies should be taught explicitly (Menner, 2007). Some effective methods that can be used to explicitly teach comprehension strategies include Read Alouds, Shared Reading, Guided Reading, and Literature Circles. In order to develop children’s reading comprehension competency, educators need to be sure that strategies such as visualizing, questioning, and inferring are being taught. Teachers should model and demonstrate these strategies to ensure complete understanding by the students. The students should be given the name and the purpose of each reading strategy (Menner, 2007). Furthermore, it is important to emphasize that good readers use many strategies to gain deep understanding of their reading.

When using reading strategies, students have to be strategic in examining the strategies that they use, which allows the reader to examine the strategy, to monitor its effectiveness, and to revise goals or means, if necessary (Afflerbach, Pearson, & Paris, 2008). With months of practice, the reading strategy will require less deliberate attention, and the student will use it more quickly and more efficiently. When it becomes effortless and automatic, the reading strategy has become a reading skill. Teachers can continue to help students by breaking down successful reading strategies into different parts so that a learner becomes aware of the parts, understands how they work, and practices combining the parts into the skilled performance that is reading. Students who learn about reading strategies can use the knowledge to become fluent and skilled, to monitor and make efficient their own reading, and to teach skills and strategies to others (Afflerbach, Pearson, & Paris, 2008). Explicit teaching of strategies requires that the objectives and the purpose of the intended content are made clear to students and that they are provided with regular opportunities for purposeful feedback. Effective teachers rely on a repertoire of flexible practices and authentic learning experiences that they can selectively implement in a variety of educational situations (Graham, Pegg, & Alder, 2007). Research has linked deficits in phonological processing to problems in word
recognition, oral reading, and reading comprehension (Graham, Pegg, & Alder, 2007). Student improvement in higher-order thinking processes, such as problem solving and comprehension, was demonstrated by their improved performance on standardized tests containing a variety of literal, inferential, and evaluative comprehension questions (Graham, Pegg, & Alder, 2007).

Parental involvement is also a huge part of improving reading comprehension skills. Parents often feel that their child’s reading habits are below the level that their child displays at school (Johnston, 1993). A parent boosting their child’s self-esteem before building their reading skills makes a huge difference in the developmental level of reading comprehension skills (Hassler, 1995). Many researchers have explored how the home environment affects the reading development of children. Researchers have noticed that when books are readily available for children to read in a home and the children have parents who enjoy reading then the children grow up displaying a passion for books and reading (Deater-Deckard, 2000). Often parents overlook the important skills of asking questions after their child has finished reading a selection, talking about the story, or listening to their child read as they get into upper elementary grades (Rose, 1999). Educators should encourage parents to support their child’s reading comprehension skills by providing workshops and instructional materials for the parents to use at home with their child (Piper, 2009).

Method

During the research, the effect of teaching reading strategies on reading comprehension was examined. Teacher observations and parent surveys were the basis of analyzing the results. This study was quantitative in nature. Fifteen fourth grade students were studied to determine the effects of teaching reading strategies on reading comprehension levels of the students. The study took place in one fourth grade classroom in which students who came from married parent homes and students who came from single parent homes were observed when collecting data.

Participants

The subjects were fourth grade students between the ages of 9 and 10. The mean age was 9 years old. The students came from mixed socioeconomic neighborhoods. Two students lived in the low socioeconomic neighborhood owned by a housing authority, six students lived in middle socioeconomic homes, and seven students lived in high socioeconomic families. The population consisted of seven male students, of which four were African-American and three were Caucasian. There were eight female students, of which two were African-American, five were Caucasian, and one was classified as biracial. Of the fifteen students, five received reduced lunch, six received free lunch, and four did not qualify for the free and reduced program. Four students of the class came from single parent homes, and nine students came from homes with both parents present, and with both parents working outside the home. Two students came from divorced families where they traveled back and forth from each parent’s home. Four students had Individualized Education Plans (IEPs) and four students were considered to have Attention-Deficit Hyperactivity Disorder (ADHD). One student had four siblings, two had two siblings, eight students only had one sibling, and four students had no siblings.
Materials

To perform this study, the researcher needed the Reading Strategy Observation Survey, and assessment recording handout. The survey was used to find out what strategies the students were using when reading independently at home in order to fully comprehend a story at the beginning of the research and it was given again at the end of the research. The students’ parents filled out the survey based on their observations of their child. The assessment recording handout was used to record the reading comprehension quiz grades of the students.

Procedures

This study lasted for nine weeks beginning in October 2009. Data were collected from weekly reading comprehension quizzes. All students took the same reading comprehension quizzes during this study. The reading strategies “Cross-Checking” and “Gaining Information Through Questioning” were implemented with interactive lessons during the second half of the study (Harvey & Goudvis, 2007). The strategies were taught to the class during whole group instruction on different days. The strategies were reinforced during guided reading group instruction (small group). The reading comprehension quiz grades were recorded weekly before and after the students were taught the two reading strategies.

Results

The data from the reading comprehension quiz grades were analyzed by the use of a two-way analysis of variance (ANOVA) based upon the results of traditional instruction and reading strategies instruction during a nine-week period and students who live in homes with married parents versus students who live in single parent homes. According to the ANOVA results, there was no significant difference in the grades of traditional teaching methods and reading strategies teaching methods, based on a significance level of p≤0.05. The p value was 0.4345. The p value for two parent versus single parent families was 0.1491, also indicating no significant difference.

Table 1: ANOVA Summary

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Parents at Home</td>
<td>62.42</td>
<td>1</td>
<td>62.42</td>
<td>2.21</td>
<td>0.1491</td>
</tr>
<tr>
<td>Instructional Strategy</td>
<td>17.63</td>
<td>1</td>
<td>17.63</td>
<td>0.63</td>
<td>0.4345</td>
</tr>
<tr>
<td>Parents x Strategy</td>
<td>0.21</td>
<td>1</td>
<td>0.21</td>
<td>0.01</td>
<td>0.9211</td>
</tr>
<tr>
<td>Error</td>
<td>733.11</td>
<td>26</td>
<td>28.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>813.37</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Although there was no significant difference between the students’ grades, there was a change in the students’ attitudes towards taking the reading comprehension quizzes.
and reading overall. The students became more confident in their reading skills and their ability to comprehend the information that they read. During the literacy block, the students were able to stay on task better when reading independently around the classroom. The surveys that were sent home with the students at the end of the second nine weeks indicated that parents had seen a significant difference in their child’s reading comprehension skills and their interest to read overall from the beginning to the end of the research period. The majority of the parents reported that they strongly agreed that their child understands what his or her book is about and that their child uses reading strategies (i.e. questioning, rereading, etc.) to understand his or her reading and that their child enjoys reading in the post-survey. The survey summary tables reveal the questions asked to the parents and the results received in the pre-survey and the post-survey from the parents.

Table 2: Parent Pre-Survey Results

<table>
<thead>
<tr>
<th>Reading behavior</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your child reads each day.</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>There are books readily available for your child to read at home.</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Your child checks out books from the public library to read at home.</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Your child understands what his or her book is about.</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Your child uses reading strategies (i.e. questioning, rereading, etc.) to understand his or her reading.</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Your child enjoys reading.</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
Table 3: Parent Post-Survey Results

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading behavior</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your child reads each day.</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>There are books readily available for your child to read at home.</td>
<td>9</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Your child checks out books from the public library to read at home.</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Your child understands what his or her book is about.</td>
<td>8</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Your child uses reading strategies (i.e. questioning, rereading, etc.) to understand his or her reading.</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Your child enjoys reading.</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Discussion

The purpose of this study was to implement reading strategies into the literacy program to improve the reading comprehension of fourth grade students. However, the most significant reward from the research was that it increased the students’ desire to read.

During the first nine-week language arts unit, the students were reading independently with only traditional instructional methods. At the beginning of the second nine-week language arts unit, the students were taught reading strategies that they could use to improve their comprehension of their reading. The results were compared to the reading comprehension quiz scores from the first nine-week period, which was given at the onset of the study.

The students performed slightly better on the reading comprehension quizzes when they received direct teaching of reading strategies. The simple conclusion is that reading strategy instruction can be used to improve reading comprehension. However, the students’ reading behaviors were impacted the most and parent surveys indicated that they had noticed the difference at home as well. The current study suggests that the method of traditional instructional methods is almost as effective as the integration reading strategies to improve reading comprehension skills. Although much of the research supports the integration of reading strategies instruction, the results of this study indicate no significant difference in the method of instruction used to impact the academic achievement of fourth grade students.

There were many restraints during this research that could have impacted the results indicating no significant difference shown between the teaching methods.
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An educator was able to work with students in a smaller group setting during guided reading group meetings and some students favored this one-on-one time and were more engaged. Some learners displayed a strong interest in the teaching of reading strategies because it was different from the traditional method of teaching reading comprehension skills.

One contributing factor for the underperformance of the students on the reading comprehension quizzes after receiving reading strategies instruction was the educator’s limited time to effectively address each strategy. There was a small number of students researched (in which some students were absent during core instruction of some reading strategies) in a short time period. The educator constantly had to rearrange the instructional time of the day due to assemblies, fire drills, late start days, and district meetings. The students received more time for instruction the first nine-week language arts unit than they did the second nine-week language arts unit due to holiday breaks. Overall, the limited amount of time given for the research and the number of students involved could have impacted the results.

Much research suggested that the integration of reading strategies can increase the comprehension skills of students. A child’s reading comprehension skills can be increased no matter the instructional strategy used. The integration of multiple reading strategies will improve a student’s reading comprehension skills but, most importantly, it will increase the student’s confidence of being able to comprehend what they read.

References


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