Improving Test-Taking Skills and Achievement in Mathematics, Vocabulary, and Reading Comprehension
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Abstract
This research paper will attempt to validate techniques and strategies used to improve students’ performance and test scores. I have been working with fifteen Language Minority students who scored poorly on standardized tests. My research will concentrate on required reading comprehension skills, vocabulary and mathematics problem solving, mathematics procedures, fractions and decimals.

Introduction
In February 2003, my principal assigned me 25 seventh grade students, 15 of who were ESL students and 10 of who were regular students. In April 2002, these students tested below the basic level in math, vocabulary, and reading comprehension on the Stanford 9 Test.¹ In addition to exhibiting deficiencies in the above cited test areas; the students were also performing poorly in their classes. To confirm the areas needing improvement the students, were given the Botel Sight Word Pre-test. The results from the 2002 Botel test were in fact consistent with the 2002 Stanford 9 Test and were also helpful in assessing the students’ weak areas.²

After analyzing the students’ test scores, and formulating a methodology for improvement, I spent three months implementing that methodology during a 50 minutes daily class period. At the end of three months, the students took the Stanford 9 Test for 2003 and exhibited higher test scores in three areas of math, vocabulary, and reading comprehension. In addition to having higher test scores, 10 of the 15 ESL students moved from testing at the “Below Basic Level” in 2002 to testing at levels of “Basic” and “Proficient” in 2003.³ The other five students made progress by increasing their scores within “Below Basic.” In fact, three of these students were two points shy of “Basic” and two moved up by 30 points.⁴ I believe with continued assistance on a daily basis, these Students’ can also achieve and excel.

¹ Appendix 1
² Appendix 1, Appendix 2.
³ Appendix 2
⁴ Ibid.
Research Questions
The project will attempt to answer two questions:

1. Can an extra 50 minutes period of special concentrated work per day improve achievement and test scores on the Stanford 9 Test in mathematics, vocabulary, and reading comprehension for LM (Learning Minority) students who are scoring below basics?

2. What strategies and techniques proved to be most beneficial in raising achievement and SAT 9 Test Scores?

Context of the Research
The research was conducted at Garnet-Patterson Middle School in Washington, DC. The school has a diverse population. Most of the students at Garnet-Patterson are from poor socioeconomic backgrounds and 95% of them qualify for free or reduced-cost lunch. Garnet-Patterson’s population is extremely diverse. One third, of Garnet-Patterson’s population originates from eight countries spanning Latin and South America, the Congo, and Asia. Accordingly, there are six predominant languages spoken by Garnet-Patterson’s student body.

Methodology
In developing my methodology for teaching math, vocabulary and reading comprehension skills, I first ascertained the learning styles of the students through the use of a Learning Styles Chart. The Learning Styles Chart revealed whether a student was a visual, auditory, kinesthetic, or tactical learner. This first step was vital to my understanding of how to best provide the students with the opportunity to improve their skills in the above-cited areas.\(^5\)

Even though these 25 students attend Garnet-Patterson together, there was still a need for devising bonding activities. My experiences have taught me that students learn better when they bond, which creates a comfort level with one another. So I then allowed and encouraged this type of bonding. Both the English Speaking students and the Spanish- speaking students whose primary language was Spanish were allowed to sit where they wanted in the beginning. I also had the students work in groups of 2s and 3s to facilitate bonding experiences.

Students were encouraged to examine their work nightly, keep their portfolios of their daily work up-dated and translate some of their vocabulary words from English to Spanish. After teaching all these strategies and techniques, I used games to verify what I was teaching them. Games and role-play were utilized to demonstrate difficult concepts. This strategy seemed to motivate the students’ learning. I programmed an additional 30 minutes in each day for students to play games like “Scrabble”, “Jeopardy”, “Pictionary”, “Chess”, “Monopoly”, “The Game of Life,” and others in response to the overwhelmingly positive and unexpected results from the material learned. Among all our lesson plans and specific teaching strategies I believe that allowing students to play

\(^5\) Appendix 3.
these games reinforced material that students may have otherwise missed. Accordingly, it had an un-quantifiable impact on the increase in students' test scores.6

Math
Several units of instruction were devised to strategically address individual needs of these 10 regular and 15 ESL learners. While Stanford 9 and pre-test scores for mathematics had shown a need for primary concentration on decimals and fractions, students were also directed in other areas to provide a base knowledge of mathematics. These other areas were in addition, subtraction, division, multiplication, ratios, and percents.

To introduce above the math concepts and theories various strategies were employed. These strategies included classroom assignments computers, Internet websites, the school building, baking projects, and games. The following describes

My strategies for Raising Mathematics Test Scores:

1. Instruct the students to mark the correct answer for each problem.
2. Guide the students in mathematics computation. The students were given assignments for measuring the school outside doors, the brick wall, etc.
3. Relate ratios, percentages, etc. to things or situations students run across in day-to-day living. A baking project was undertaken by the students. The students had to measure ingredients and apply their fraction skills and correctly follow their cookie recipes.
4. Outline set procedures for mathematics computation.
5. Require the students to prove their answers to be correct and quote rules.
   Assign students assessment lessons found on the Internet websites.

Vocabulary and Reading Comprehension
In order to facilitate a stronger understanding of vocabulary and reading comprehension, the students’ instruction focused in the following areas:

1. Synonyms
2. Antonyms
3. Word Meanings
4. Multiple Meaning
5. In Context
6. Derivations

In teaching the vocabulary skills the students were instructed to: read pairs of Word-meaning and find the words that agree with both meanings, and choose the best words to complete various sentences. They were guided in categorizing words with multiple meanings and were required to choose 10 vocabulary words to pronounce and spell in English and Spanish on a daily basis. The students also had to incorporate the words they had learned in

6 Ibid.
weekly assigned essays and poems which also became part of their workbooks that they read and shared in class.\textsuperscript{7}

In addition to the afore cited specific class activities, I developed a school-wide vocabulary learning program which I named, “Garnet-Patterson Middle School Weekly Vocabulary Activities.” The students were directed to focus on consonant and vowel sounds, root words, and affixes. Students were also encouraged to make selections of contextual analysis, complete unfamiliar words, and define new words.

Reading comprehension activities involved reading passages and answering questions. A textbook and several workbooks were utilized in monitoring comprehension skills. After reading short stories, students were required to take notes, reflect and summarize what they had read. The students were required to determine main ideas, select and evaluate paragraph content and write summaries about what they had read. They were also expected to think critically; identify opinions and supporting evidence; identify and use text organization; and engage themselves in post-reading activities. All of these strategies reflected on what was read and encouraged students to apply new learning techniques.

Research

My method of having the students write their own stories about any interest in their life and share it with their paired partners and to their classmates to improve vocabulary skills is supported by M.R. Schirmer in his book. Schirmer indicates that to encourage the reading process is to, “Have students’ come up with their own story.”\textsuperscript{8} Their stories were read to their peers and their pair-share group. Great enthusiasm was in the classroom on the days they were to share their writings. In order to help students adjust to the new class and strategies for learning, routines were developed that allowed the student to anticipate expectations for each day.

Directions for all lessons and assignments were written and placed in a visible area of the classroom. I had students work in pairs and occasionally they worked in small cooperative groups. This allowed students to restate the task for the day and discuss directions if needed. This technique was most helpful to groups that were behind in their assignments.

A classroom strategy suggested by Gunning, involves the use of print to support English-language learners.\textsuperscript{9} I incorporated this strategy by posting students’ work, charts, maps, calendars, posters, vocabulary words, schedules and daily directions throughout the classroom. We drew pictures and used models in order to provide concrete concepts. Therefore, my methods were in line with Gunning’s philosophy indicating print to support English-language learners. He said, “Items in the room are labeled, schedules, directions, and routines are listed.”\textsuperscript{10}

\textsuperscript{7} Appendix 5
\textsuperscript{8} Schirmer, pg 52-55.
\textsuperscript{9} Gunning, 2000.
\textsuperscript{10} Ibid.
Summary

I found using past 2002 Stanford Test Scores to be an effective means of evaluating each student’s current skill level because it was the most objective empirical measurement of their strengths and weaknesses.

The Learning Styles Chart was quite useful in helping me develop and choose strategies and techniques for teaching my LM students. The Learning Styles Chart helped me decide what techniques to use in order to help my students learn best. Identifying learning styles was absolutely essential to avoid time wasting approaches that do nothing but frustrate my students and me. Having identified their styles I was able to use targeted approaches that they could relate to and thereby create immediate success. I discovered that most of the students were visual learners. Accordingly, I taught with manipulatives, overhead projectors, computers, posters, chalkboard, and games. The games particularly played a valuable role in maintaining student interest and adding an element of fun to their learning. They encouraged the students to show off their new knowledge, vocabulary skills, their creativity, critical thinking, analytical skills, and competitive skills. Additionally, they were a great culmination to the week’s activities.

Baking was an excellent way to teach ratios and fractions. The students were excited about this project and it enhanced their desire to understand math concepts associated with the recipes. I will definitely use this method and strategy in the future.

The Internet was a very useful resource that I used to help students improve. It allowed me to integrate yet another teaching medium to reinforce classroom lessons. However, I found it very challenging to check each student’s Internet coursework due to time limitations. The computer engaged the students in interactive learning. They indicated that they loved the computer because some of the math problems had graphics and there was immediate feedback on what was right and what was wrong. They were excited about working with the computers instead of their workbooks and writing board.

Students’ stories were quite a hit. They enjoyed writing and sharing them. I believe their experiences correspond with Schirmer thesis—it allowed the students to “be motivated to read and be part of the language experience.” 11

Another strategy I used was cooperative learning. “Cooperative Learning can be an advantageous strategy for ESL student.” 12 I believe my experiences with this method support many of the premises put forth by Leverett and Diefendorf. The students continuously played off of each other and meshed their weaknesses with their strengths thereby ensuring success of every person in the group. Every student demonstrated improvement via my teaching methods as evidenced in their 4th advisory grades.

The Stanford 9 Mathematics, Vocabulary, and Reading Comprehension Test Results arrived at school during the latter weeks of this study. My initial

11 Schirmer, pg 52-55.
12 Leverett and Diefendorf, 1992.
objective with this study was to raise every student’s score to basic. My secondary objective was to demonstrate improvement from every child. As indicated previously, the test scores showed great improvement. Two thirds of the class accomplished my initial goal. I attribute their dramatic success to the techniques and strategies that I employed throughout the two advisories. I was able to create immediate and recognizable improvement simply through modifying the standard teaching approach to a more targeted one, focused to the learning styles of each student. Consequently, three students’ scores skyrocketed from “Below Basic” to “Proficient.” Yet, I was somewhat disappointed with the progress of five students that failed to achieve the “Basic” score. While I failed to attain my initial goal with this group, I did attain my second goal—by raising their scores a minimum of 20 point thereby demonstrate marked improvement.

While concluding my study I have reflected and evaluated reasons for the more moderate success of the lower third of my class. The common factor amongst the lower third is that their class attendance was lackluster at best. The students that succeeded attended class regularly and those that did not excel did not attend class regularly. Therefore, my only hypothesis is that while targeting students learning styles can have a substantial impact on student performance—students must still come to class to succeed. Still, among the lower five students, three were only two points away from attaining the minimum “Basic” score.

This Action Research helped me examine current “Best” practices more closely in order for me to accommodate my students learning. My students and I were confronted with many challenges. Nevertheless, we persevered. My students overcame those challenges because I instituted the right strategies, techniques, and methods. Many students found me on the last day of school after having received their final report cards. Each of them had a clear expression of accomplishment, joy, and appreciation for what they learned in my class. Moreover, my colleagues and Principal expressed congratulations for the accomplishments of my students.

13 Appendix 2.
References


Appendix 3, Learning Styles

***Note:

This chart was given to students to help assess their learning styles and tailor teaching methods to best meet their needs.

<table>
<thead>
<tr>
<th>When you...</th>
<th>Visual</th>
<th>Auditory</th>
<th>Kinesthetic &amp; Tactile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spell</td>
<td>Do you try to see the word?</td>
<td>Do you sound out the word or use a phonetic approach?</td>
<td>Do you write the word down to find if it feels right?</td>
</tr>
<tr>
<td>Talk</td>
<td>Do you sparingly but dislike listening for too long? Do you favor words such as see, picture, and imagine?</td>
<td>Do you enjoy listening but are impatient to talk? Do you use words such as hear, tune, and think?</td>
<td>Do you gesture and use expressive movements? Do you use words such as feel, touch, and hold?</td>
</tr>
<tr>
<td>Concentrate</td>
<td>Do you become distracted by unidiness or movement?</td>
<td>Do you become distracted by sounds or noises?</td>
<td>Do you become distracted by activity around you?</td>
</tr>
<tr>
<td>Meet someone again</td>
<td>Do you forget names but remember faces or remember where you met?</td>
<td>Do you forget faces but remember names or remember what you talked about?</td>
<td>Do you remember best what you did together?</td>
</tr>
<tr>
<td>Contact people on business</td>
<td>Do you prefer direct, face-to-face, personal meetings?</td>
<td>Do you prefer the telephone?</td>
<td>Do you talk with them while walking or participating in an activity?</td>
</tr>
<tr>
<td>Read</td>
<td>Do you like descriptive scenes or pause to imagine the actions?</td>
<td>Do you enjoy dialog and conversation or hear the characters talk?</td>
<td>Do you prefer action stories or are not a keen reader?</td>
</tr>
<tr>
<td>Do something new at work</td>
<td>Do you like to see demonstrations, diagrams, slides, or posters?</td>
<td>Do you prefer verbal instructions or talking about it with someone else?</td>
<td>Do you prefer to jump right in and try it?</td>
</tr>
<tr>
<td>Put something together</td>
<td>Do you like at the directions and the picture?</td>
<td></td>
<td>Do you ignore the directions and figure it out as you go along?</td>
</tr>
</tbody>
</table>

Appendix 5, Students Work (8 pages)

(Note: This appendix is only an excerpt from the Student notebook that has been assembled. It includes various writings and examples of student coursework)
Volume

Garnet-Patterson Middle School
Test-Taking Skills
Mathematics, Vocabulary and Reading Comprehension
Preface

This book included creative work done by my seventh-grade multicultural students involved in test-taking activities. It emphasized skills in mathematics, reading, vocabulary, and reading comprehension.

After gaining a deeper understanding of mathematics concepts, vocabulary building, and techniques for reading comprehension, these students used the Internet to locate problems in the areas of decimals and fractions. They also wrote creative essays and poems, which applied the knowledge gained.

We are hopeful that examining our work will give you clear insight into our progress.

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Garnet-Patterson Middle School
Change Facilitator & After School Facilitator
There was a boy of Maryland who was taking calligraphy and knew a lot of epigrams. In one of his classes he took graphics and PowerPoint. One day he was taking English and then he was called to the office claiming that he had to go home; he didn’t know that he had a citation for not paying for ordering the catalog. In a few seconds the so-called father took him off to the Supreme Court. He was charged and sentenced to 30 years of community service doing typography and holography.

In an audible whisper he said a short prayer. Then the judge proclaimed it done. With his monogram on a contract it was official. After a year he had a fever; And he took some antibiotics. He had to also do some service for his parent’s cleaning the biosphere in his backyard.

After 30 years of hard work the boy had enough money to buy some lunch and a chameleon. The boy had a passion to tell people about his life and became an anthologist. With enough money he bought some paper and began his story with a dialogue. Since he kept on running out of paper, he made it an episode. The publishers accidentally turned his story into an allusion. Then they foreshadowed false events in his life to spice up the story. With out the boy knowing they made a volume out of his story. After they gave him a pseudonym. With that they made an image on his cover with his picture on it for a token of
gratitude. They said it was literary work. The cover had some fine texture with a cover on it.

Octavia Boyd Smart Girl With Smart Attitude.

There was a girl name Lucy. She was very smart. In the third grade she knew typography, monography, and stenography. She made her own epigram. She could not be in any activity because of her attitude. Teachers want to motivate her but, her attitude is just not good. Her mother thought her attitude came from the television episodes she watched. So her mother made her stop watching television. She began to do other fun things. She made her own Terrarium. Just for changing her attitude she got skipped to the next grade. She studied on a microbe that she was scared of. She wrote her own glossary. When she finishes school she bought everything she ever wanted. She bought things that will help her to browse. Now she can abridge her own work. All those people who teased her tried to devitalize her. They all are now a bad image. If people did not hang around her they would serialize with her bully. Every morning she was blissful. One morning she was depressed about her child. She had compassion for her child. Her child was named Kitana. Kitana started having bad habits with homework. She always wanted to learn about botany. So her mother took away all her freedom. She starts acting better.

Dance...

Milton

IT’S A POEM FROM MY HEART
It’s BASED ON DANCE AND HOW I FEEL
My story is mainly about dance. I use affable language because you never know whom you might meet and you never know what they can do for you; they may famous. When I depress my feet I really work hard because in life I want to go far. I really have compassion for dance I really do. When I am on the floor doing my thing bliss fills my heart and lets me know there is a God up there. Some were because he has bless me and help me and he has let me go far even though some day if I see God I might be a little dismay and a little afraid but while I am on this earth I just hope people will endear me and care for me. I know I didn't come in this world for no body to like me but dancing and my Education is all I believe. When I use to go on the stage I use to feel somber and fear cause I didn’t really know no one out there but when I feel socialize for ever one I mean like I really know them when I dance I have fun but really it just begun because I never wanted to stop. I wanted to dance until I drop I wanted to dance to bialy because the music is like forlorn because it is sad and lonely type.

Britnney Milton
Math
5-15-03

Converting fraction to decimals
Example the fraction ⅓ means 1 divided to convert the fraction ⅓ to a decimal divide the number by the denominator.

<table>
<thead>
<tr>
<th>1</th>
<th>⅓  = .375</th>
<th>2</th>
<th>2/5 = .40</th>
<th>3</th>
<th>⅔  = .75</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>1/3 = .30</td>
<td>5</td>
<td>7/10 = .70</td>
<td>6</td>
<td>2/3 = .66</td>
</tr>
<tr>
<td>7</td>
<td>17/20 = .85</td>
<td>8</td>
<td>19/20 = .9</td>
<td>9</td>
<td>1/6 = .15</td>
</tr>
<tr>
<td>10</td>
<td>1/5 = .2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

percent

<table>
<thead>
<tr>
<th>1</th>
<th>0.45 = 45</th>
<th>2</th>
<th>0.25 = 25</th>
<th>3</th>
<th>0.10 = 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>0.50 = 50</td>
<td>5</td>
<td>0.65 = 65</td>
<td>6</td>
<td>0.01 = 1</td>
</tr>
<tr>
<td>7</td>
<td>0.2 = 2</td>
<td>8</td>
<td>0.75 = 75</td>
<td>9</td>
<td>0.8 = 8</td>
</tr>
<tr>
<td>10</td>
<td>0.90 = 90</td>
<td>11</td>
<td>0.22 = 22</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
I went to the following websites:
www.Math.com
www.Askjeeves.com
www.operationmultiply.com

I had to divide and I did a little bit of fractions
One day a dumb teacher was teaching about the biosphere. He then started talking about botany. You could tell he had difficulty talking, he mixed his words into one sentence.” Give me biosphere, botany and a chameleon.” He said. I think he tried to speak in an inaudible voice on purpose. I asked him to speak more verbally. I bet he made an impromptu speech. He probably lives in his own blissful world. I wonder what academic school he went to. Every time he made a mistake everyone laughed at him. I saw him after school walking through an arboretum. He dropped a piece of paper I looked at the paper. It was about his scholar in zoology. In his back yard he had habitats for a lot of animals. The cages were painted vividly. When he wasn’t in school he spoke coherently. He made a proclamation that he acts dumb. He said it was his rep. He wasn’t speaking in his usual garble voice. He voice sounded oratorical. The voice in which he spoke was eloquent. The next day in school he made a monologue using non-sense. He walked in a motivated way. He had a bibliophile stack, so he was really smart.

Reducing Fractions

1) 9/15 = 3/5
2) 4/18 = 2/9
3) 5/25 = 1/5
4) 6/12 = 1/2
5) 9/12 = 3/4
6) 4/12 = 1/3

Subtracting Decimals
1) $886.951 - 58.285 = 828.566$
2) $181.230 - 57.898 = 123.332$
3) $171.353 - 72.620 = 98.73$

**Percents  5/15/03**

1) 10% of 50 = 5
2) 30% of 4 = 1.2
3) 20% of 5 = 1
4) 100% of 6 = 6
5) 80% of 20 = 16
6) 65% of 100 = 65
7) 40% of 10 = 4
8) 25% of 20 = 5
9) 60% of 40 = 24

**Percents (continued)**

1) 0.45 = 45%
2) 0.25 = 25%
3) 0.10 = 10%
4) 0.50 = 50%
5) 0.65 = 65%
6) 0.01 = 1%
7) 0.2 = 20%
8) 0.75 = 75%

**Percents (continued)**

9) 0.8 = 80%
10) 0.90 = 90%
11) 0.22 = 22%
12) 0.88 = 88%
13) 0.3 = 30%
14) 0.41 = 41%
15) 2.50 = 2.50%
16) 0.7 = 70%
17) 1.25 = 125%
18) 0.55 = 55%
19) 0.15 = 15%
Poems bring me a lot of bliss
In a poem I confide my problems
and my feelings.
My poems are epigrams
that are easy to read.

Princess

One day there was a girl name Princess. She was with her friends at a party. She was feeling very bliss to be there. When she found out that people her age were smoking, she was feeling depress. The people that were there thought that she was affable and tried to talk her in to smoking. She was thinking, “Should I go or stay.” She stayed but did not participate.
My name is Zulma Romero. I am 12 almost 13 years old. I am very passionate and eloquent. I like to do oratory speeches. My friend and I communicated verbally. I am a babysitter. I love babies. I like art. I like to take pictures. My teacher clarifies things for me. I don’t like to read, so I browse.

Carlos

There was a boy named boomer. He would sometimes write a story very coherent by explaining how he feels. Sometimes he would be audible when he reads a book. When he would sometimes read he would digress. Sometimes he would mostly be eloquent when he has time alone. Sometimes he would garble his words in his story. One time he was impromptu on his presentation because he did not practice. He had good oratory by speaking in front of the public. He would sometimes use his words in a verbal way. Boomer proclaim that he was going to present a long story to the people. It was the day where he was going to read his monologue story.

After that he decided to become an artist. He started practicing on clay. The next day he had an audition in front of people. He was working on ceramics. He started to become a classical artist. He would sometimes daub his creations. He would sometimes make medley out of art. He would sometimes add melodious sounds when he made art. Sometimes he would orchestrate his band. The next day he got a new palette to draw on and paint. Sometimes he would make art with pantomime. Sometimes he would feel texture when he made art.
dialogue

Game board means presentation