Intervening to increase general academic vocabulary: Word Generation, Year Two

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Two anecdotes

- Vocabulary improvement program: educational researchers succeeding on the criteria applied to Arts & Sciences researchers

- Teacher-initiated vocabulary analysis: absence of approved procedures for validating craft knowledge

Two anecdotes analyzed

- Vocabulary improvement program
- Teacher-initiated vocabulary analysis
- Research-based knowledge is hard to get into practice
- Practitioner-generated knowledge is hard to evaluate, replicate, disseminate, or institutionalize

Thus, SERP

- Strategic Education Research Partnership
- A different way of doing educational research
- An experiment in the sociology of knowledge (like the MacArthur Foundation experiment on collaboration)
- And an on-the-ground attempt to help schools change

Pasteur's Quadrant

	Contribution to theory +	Contribution to theory -
Contribution to quality of life +		
Contribution to quality of life -	Bohr	

Pasteur's Quadrant

	Contribution to theory +	**Contribution to theory -**
Contribution to quality of life +		Edison
Contribution to quality of life -	Bohr	

Pasteur's Quadrant

	Contribution to theory +	**Contribution to theory -**
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Contribution to quality of life -	Bohr	Audubon

Pasteur's Quadrant

	Contribution to theory +	**Contribution to theory -**
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SERP Principles

- Emergence of questions from practice, i.e., ‘Practice-embedded/use-based research’ or ‘working in Pasteur’s quadrant’
- Working at three levels simultaneously (student learning, teacher learning, organizational learning)
- Recruiting multiple forms of expertise
- Creating local solutions designed to travel
- Engineering tools that carry knowledge across sites
- Developing procedures to accumulate knowledge across sites
- Exploiting bottom-up as well as top-down sources of wisdom

Getting started in Boston

Interviewing and surveying teachers

- Comprehension a universal worry
- Many problems mentioned
- Vocabulary challenges widely noted

Observing in classrooms

- Little vocabulary instruction overall
- Focus on disciplinary vocabulary
- Content area texts challenging, unengaging

Literacy assessments

- Many readers struggling with comprehension
- Low vocabulary across the board
- Problems with word reading, fluency for some

Boston/2007 NAEP- Reading 4th and 8th grade

- **4th grade**
- 49.81 Below Basic
- 33.91 Basic
- 13.75 Proficient
- 2.52 Advanced

- **8th grade**
- 40.37 Below Basic
- 43.47 Basic
- 15.11 Proficient
- 1.05 Advanced

http://nces.ed.gov/nationsreportcard

Mystic Elementary: One collaborating school

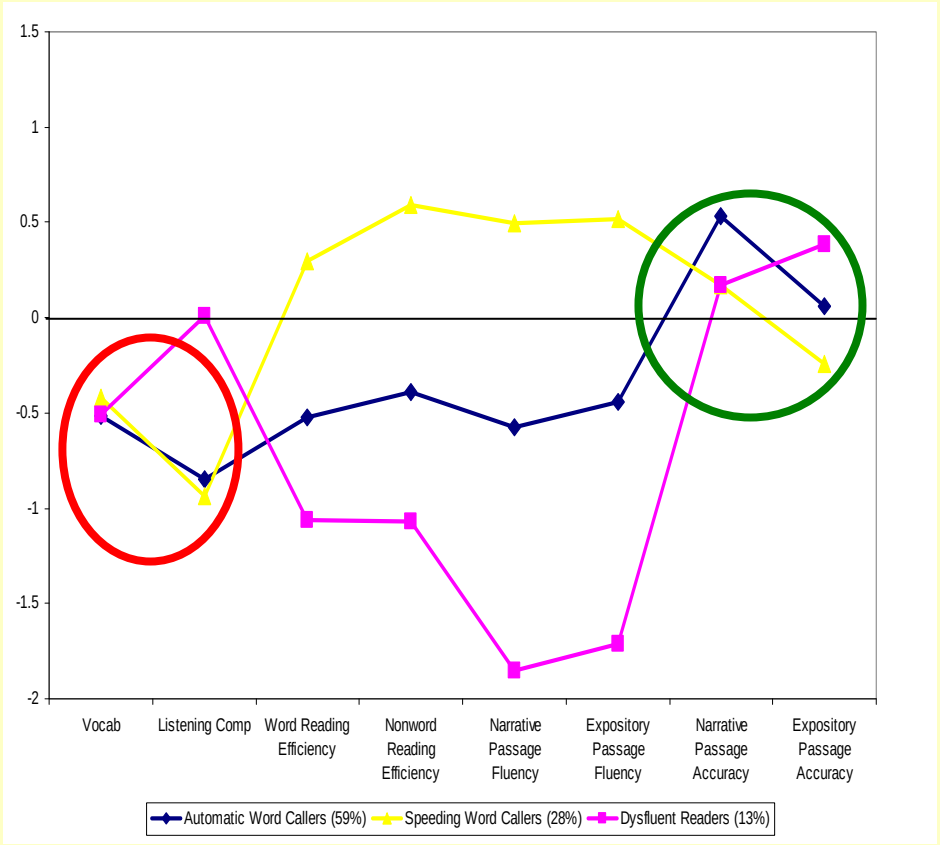
- Students are
  - 90.7% Latino
  - 91% Low income
  - 78.7% Language Minority
- Assessed all 5th-8th grade students in mainstream instruction
- Struggling Comprehenders
  - < 35th percentile in reading comprehension on national norms

Grade	Year 1	Year 2
5th	55 (26)	53 (25)
6th	45 (22)	60 (22)
7th	35 (19)	39 (14)
8th	27 (12)	36 (17)
Total	162 (79)	188 (78)

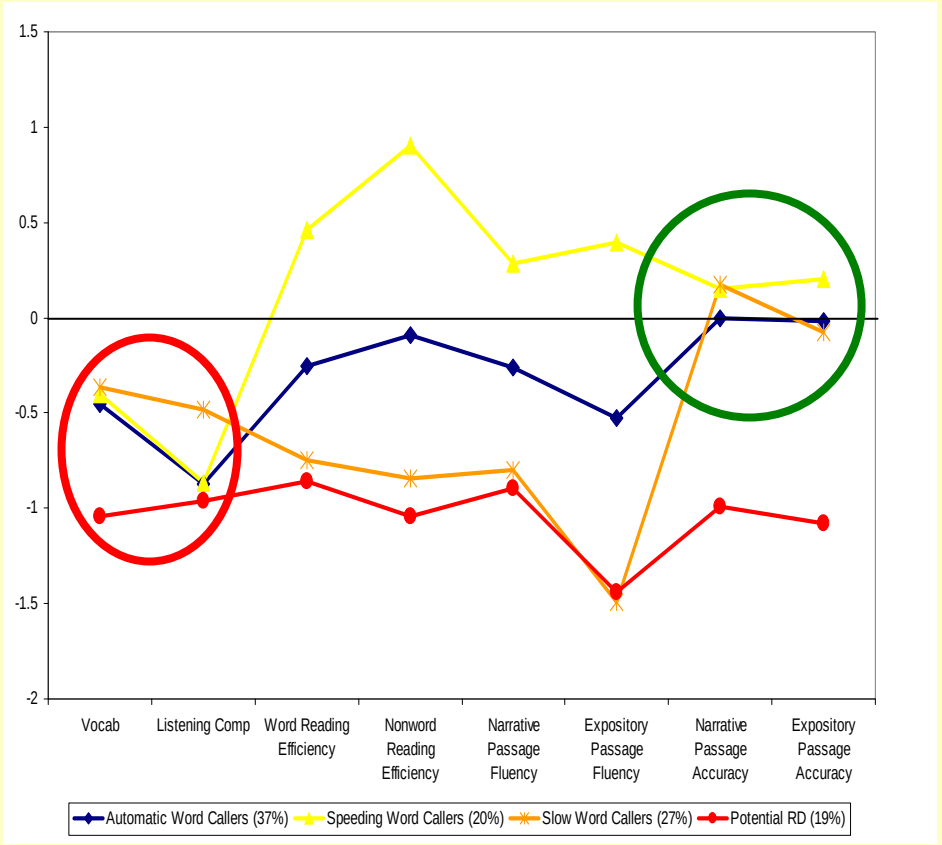
Strategic Education Research Partnership

Profiles of struggling Mystic readers

Year 1



Year 2



The Challenge

- Part of the achievement gap is a vocabulary gap
- Less is known about adolescent vocabulary development than about word learning in younger children.
- ELLs in particular need school-based support for vocabulary learning

Challenges to Vocabulary Instruction

Our initial classroom observations in BPS revealed that:

- Academic vocabulary was infrequently taught
- Instruction was fragmented over content areas
- Texts and topics failed to engage adolescents

Implications for Teachers and the District

- Only a few students need intensive instruction in the code
- A minority of students need targeted intervention in fluency
- Vocabulary is the most promising leverage point for whole-class instruction
- **So how do we teach vocabulary?**

The SERP Team Response

Word Generation, designed to

- Build the vocabulary of middle school students through repeated exposure to high frequency academic words in various contexts;
- Promote regular use of effective instructional strategies among teachers;
- Facilitate faculty collaboration on a school-wide effort.

Over-arching goal of WG

To create an “easy-to-embed,” engaging, and effective word study program that develops a repertoire of vocabulary-building practices among teachers and students, which become “institutionalized” over time across all subject areas.

Word Generation Program Features

- Focus on the *Academic Word List* (AWL)
- Materials designed for flexible use across the curriculum
- An expectation that schools will dedicate at least 15 instructional minutes a day
- An opportunity for each school team to design a practical implementation plan that suits its own particular school context

Word Generation: Materials

- 24 weeks, each focused on a set of 5 words
- 4 strands/content-areas with 6 topics each
- Controversial topics include:
  - **Science strand:** stem cell research
  - **Math strand:** athletes and multi-million dollar salaries
  - **Social Studies strand:** Should English be the official language of the US?
  - **English Language Arts strand:** affirmative action and college admissions

Word Generation: Weekly Schedule

Monday	Tuesday-Thursday	Friday
Paragraph introduces words	Content-area word activities	Writing with focus words

A Typical Word Generation Week, Yr 2

Mon.: Establish word meanings
Comprehend the gist of the passage

Tues.: Identify different positions on the issue
Begin to argue for and against positions

Wed.: Establish math version of definition
Discuss math multiple choice questions

Thurs.: Science cloze paragraph
Discuss science open response question

Fri.: Writing activity

Day 1 - Launch

Introduce passage, containing *academic vocabulary*, built around a *question* that can support discussion and debate

Should the government pay for stem cell research?

In summer 2003, toddler Kai Harriott of Boston was sitting on her porch, singing with her sister. A gang member shot into the air to scare Kai's neighbors. Kai was hit by a bullet. After being shot, Kai was paralyzed. She could not move from the waist down. Because of her injury, Kai must use a wheelchair. Scientists have a theory that stem cells can someday help people like Kai.

Stem cells are found in different parts of the human body, including in our blood. Stem cells are also found in fertilized human eggs, called embryos. Stem cells from embryos can develop into cells that do many different jobs in the human body. With more research, we may be able to grow replacement parts for humans from stem cells.

If doctors can grow spinal cord cells, people like Kai might walk again. New brain cells could help people who have had strokes or Alzheimer's. Scientists might also learn to grow the cells that make insulin. This could help people with diabetes. But to obtain stem cells, scientists must destroy a human embryo.

Many people think that human life begins when an egg is fertilized. They think destroying a human embryo is murder. They say scientists should only work with stem cells from adults. But stem cells from adults won't grow into many different kinds of human cells. Stem cells from embryos may be our only hope of curing diseases. Investigating stem cells will take years and cost millions. Should the government pay for stem cell research?

Included in Day 1

A list of five *target words*, both *academic* and *content vocabulary,* and their definitions, both kid-friendly and dictionary-like

Paralyzed (adj.): Unable to move

Embryo (n.): An organism at a very early stage of development; a fertilized egg

Theory (n.): A hunch, an unproven idea, or a systematic set of predictions

Obtain (v.): To get

Investigating (v.): Learning about; exploring

Also included on Day 1

A list of five *comprehension questions*, to guide the class in checking understanding of the passage

Comprehension Questions:

1. How was Kai Harriott paralyzed?
2. What theories do doctors have about how stem cells could help people?
3. What is an embryo?
4. Why do some people think we shouldn't obtain stem cells from embryos?
5. Should the government pay for the work of scientists who are investigating stem cells?

Strategic Education Research Partnership

Day 2 - Social Studies

Developing *positions on the issue* set out in the passage, to help the class frame the debate.

Positions:

1. Scientists should not be allowed to investigate cures for disease using stem cells from embryos. This is trying to “play God”.
2. Destroying an embryo to get the stem cells is murder.
3. The government should pay for embryonic stem cell research. This could lead to cures for many injuries and diseases.
4. Scientists should be allowed to do research on embryonic stem cells, but the government should not pay for it because many taxpayers oppose it.

Note: these are **optional**. The class may want to develop its own positions!

Strategic Education Research Partnership

Day 3 - Math

MCAS-type mathematics problems using some of the target words:

1. Some people believe that embryonic stem cell research is important. They think this because scientists use these cells to investigate diseases. Scientists try to find cures for these diseases, and for conditions like paralysis. Other people believe that embryonic stem cell research is wrong. They think this because scientists must destroy embryos to obtain these cells. In a recent poll, 40.75% of people said that the government should not pay for embryonic stem cell research. Which decimal is equivalent to 40.75%?

A) 4.075
B) .4075 *
C) .04075
D) .02

a) Students can work in pairs
b) Whole class discussion
c) Open-response (show/explain how you got your answer)

Day 4- Science

A science-related *cloze passage* to give students more practice using different forms of the words:

paralyzed theorize obtained embryos investigating embryonic

The debate over stem cell research has caused some Hollywood stars to enter the world of politics. Michael J. Fox, a movie and TV star, has given money to political candidates who support _____ stem cell research. For him, _____ the medical uses of stem cells _____ from human _____ is very important. In 1991 Fox was diagnosed with Parkinson's Disease. This disease occurs when cells in the brain die or stop functioning well. These cells help the body's muscles to move in a smooth and coordinated way. Because their muscles do not have enough of these cells, people who have Parkinson's Disease experience shaking, slow movement, stiffness, and problems with balance. Some medicines can help, but there is no cure. However, like people who have been _____ by spinal injury, scientists _____ that stem cell research may lead to much better treatment for those with Parkinson's Disease. Yet this type of research is controversial.

If time, a related open-response question can be used as a basis for discussion (Should the government continue to restrict funding for embryonic stem cel research? Why or why not?)

Supplemental activity if time permits..

A set of *prompts for word study* of the target words

ELA Word Study:

1. Remind students that Kai Harriot was paralyzed—that is, unable to move parts of her body. "Paralyzed" can also mean "temporarily stopped or unable to act. Ask them to think of situations in which they or the systems around them might be paralyzed in this way. Provide a few examples to get them started.

The entire city was paralyzed by the blizzard that brought four feet of snow.

He tried to force himself to see who was at the door, but he was paralyzed by fear.

The lightening knocked out several cell phone towers, and paralyzed communications.

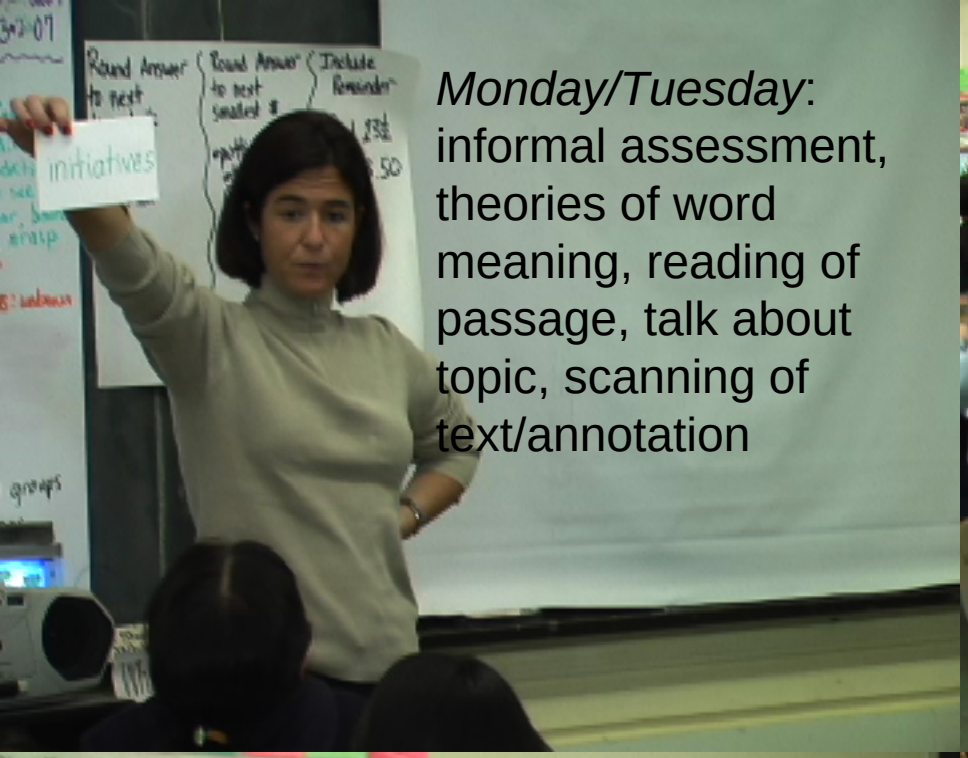
Day 5- ELA

Writing Activity

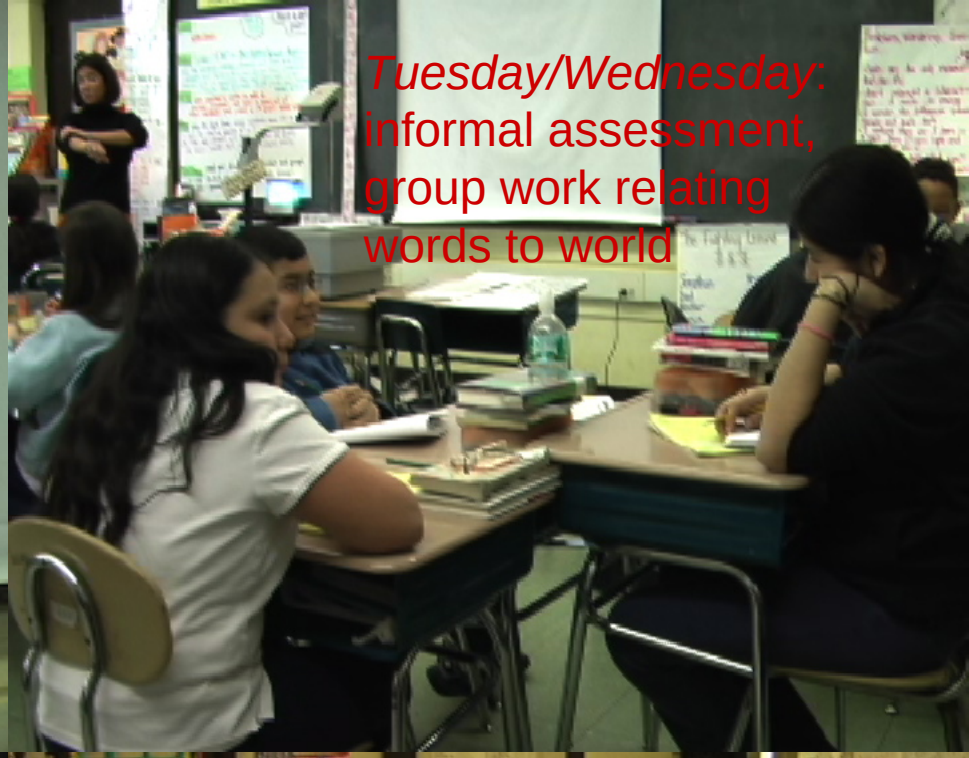
Should the government pay for stem cell research? Give evidence to support your position.

Working with teachers on WG

- Focus group to brainstorm topics
- Teacher academy to review initial materials
- Intensive feedback on weeks 1-5
- Weekly reviews from interested teachers
  - Improvements in teacher materials
  - Redesign of math problems
- Teacher-contributed materials
- Teacher participation in website development

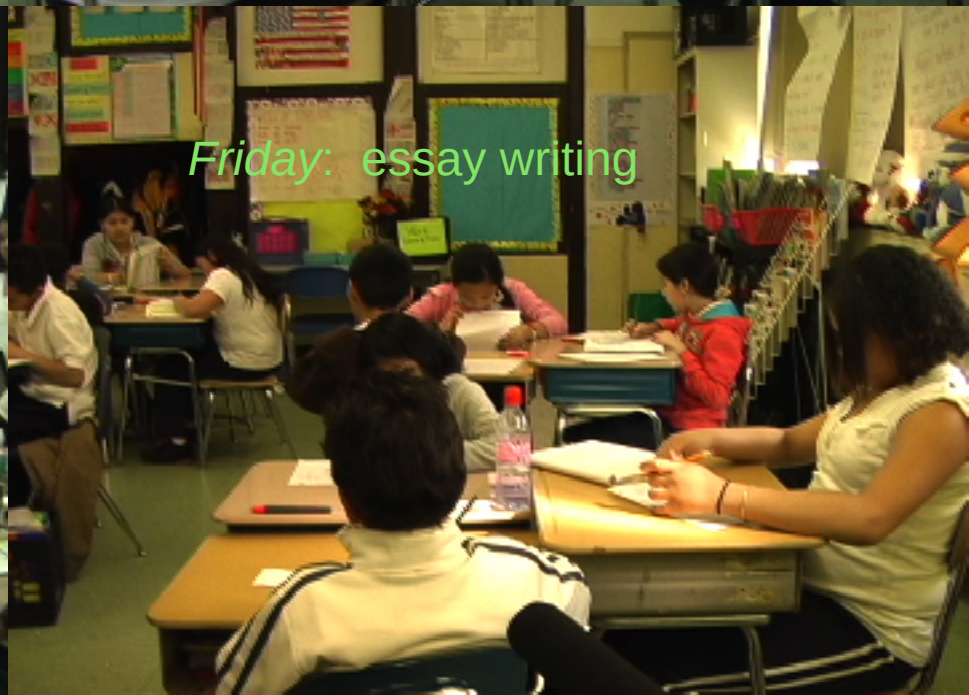


Monday/Tuesday: informal assessment, theories of word meaning, reading of passage, talk about topic, scanning of text/annotation



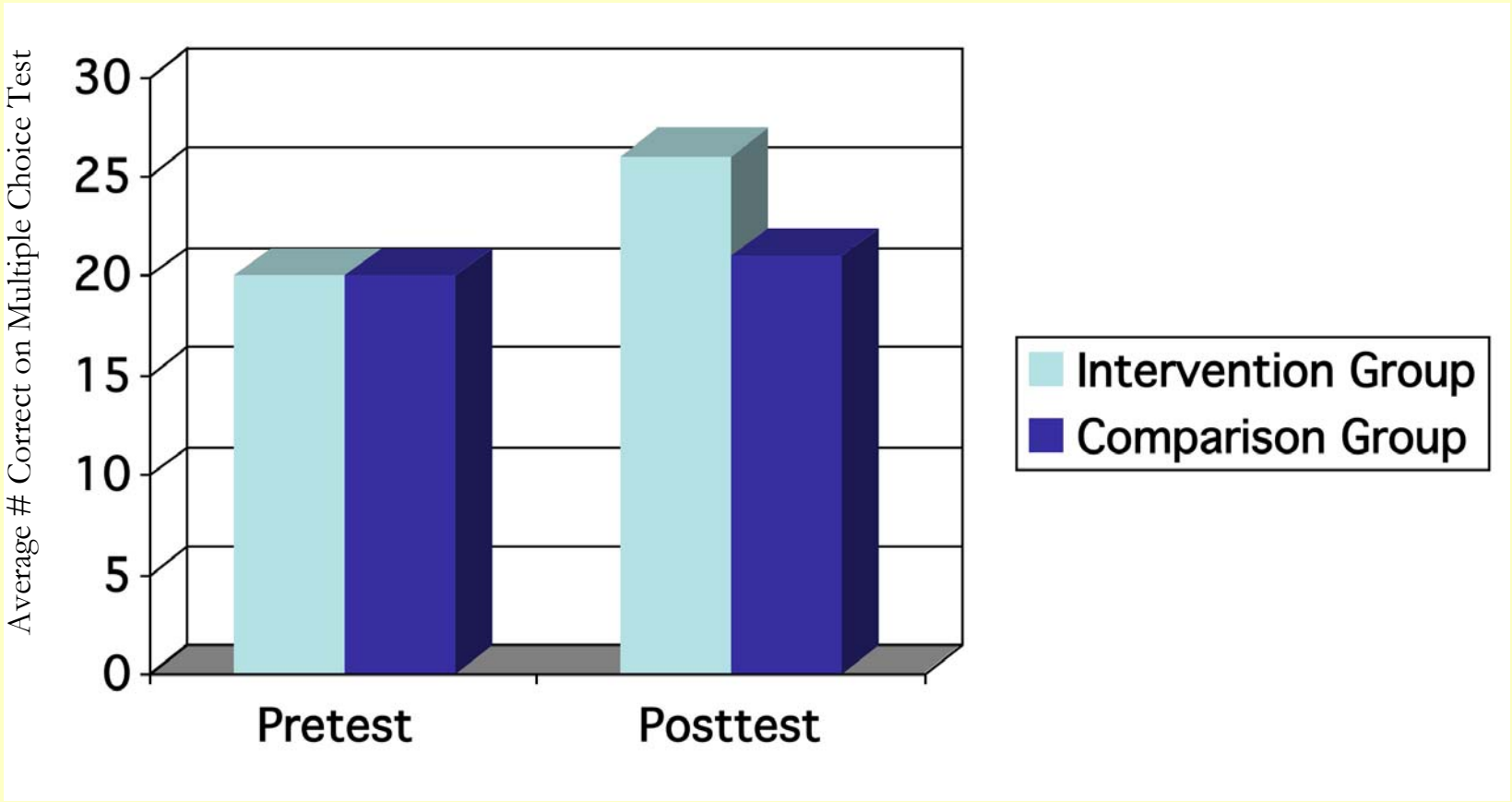
Tuesday/Wednesday: informal assessment, group work relating words to world

***Wednesday/Thursday*: debate**

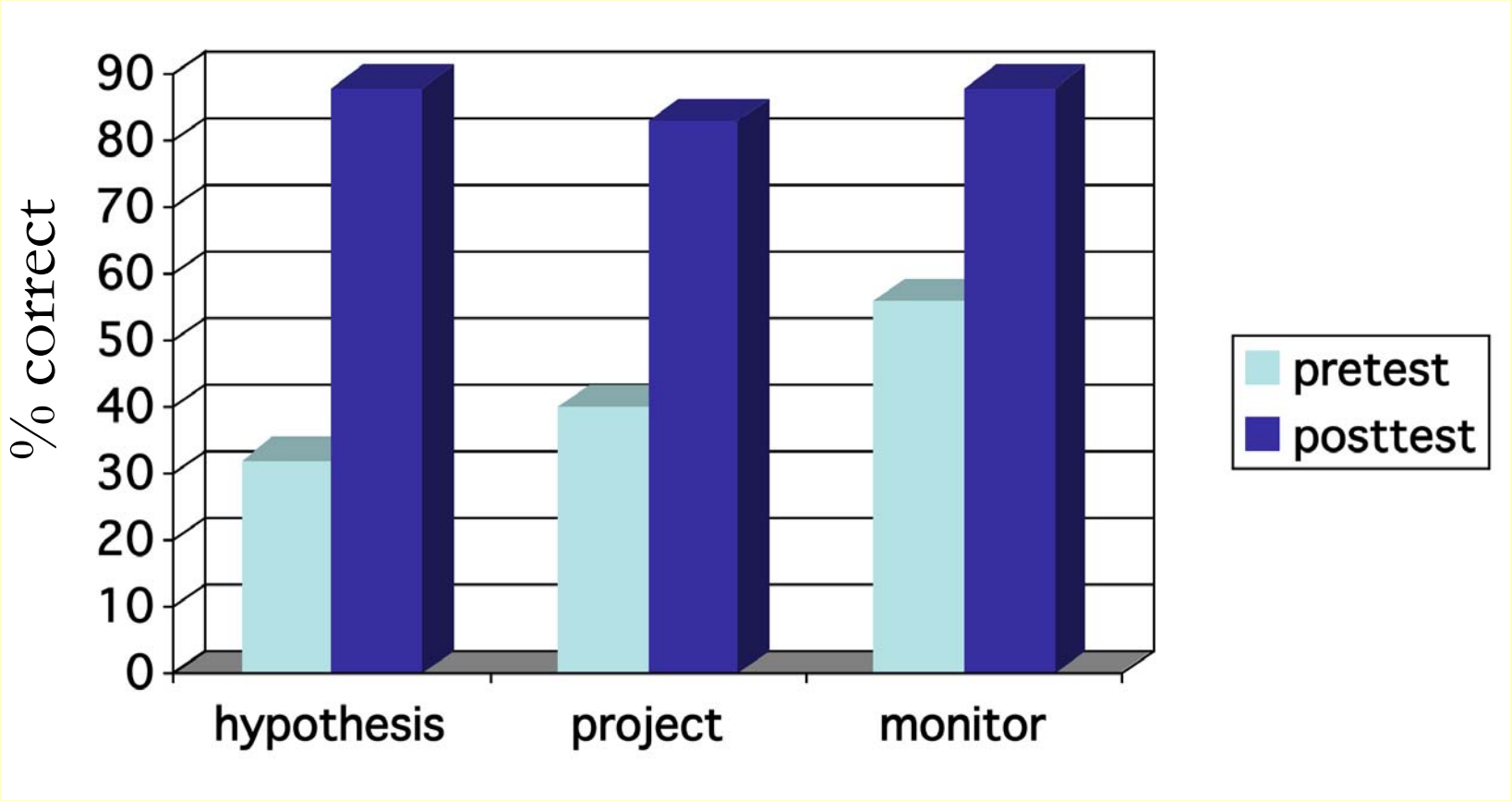


Friday: essay writing

Multiple Choice Test Comparison, Mystic School



Top 3 Words Mystic Students Learned



Mystic Student Testimonials

Examples of student responses about the benefits of WG

It got me familiar to new words and my writing got better.
When we go and write something our writing sounded much more matchure.
Now I use more Word Generation in my writing.
Before I only used simple and boring words. Now I'm a better writer because my writing has Word Generation words and it makes it more interesting.
I learned new words. I made my writing sound outstanding.

Year 1 Whole School Pilots

<u>Westfield</u>

<u>Middle School</u>

- 80 % Black
- 16% Hispanic
- 1.8 White
- 1.6 Asian
- 29% Special Education
- In ‘needs improvement status’

<u>Reilley</u>

<u>Middle School</u>

- 62% Black
- 18.1 % Hispanic
- 9.3% White
- 8.9 % Asian
- 25% Special Education
- In ‘needs improvement status’

Two Boston Middle Schools

- Westfield
  GRADE: 3.6 = mean stanine score, 49% scored ≤ 3rd stanine

- Reilley
  GRADE: 4.4 = mean stanine score, 29% scored ≤ 3rd stanine

MCAS ELA

	6th	7th	8th
A/P	26%	23%	39%
NI	51%	48%	43%
W/F	23%	29%	18%

	6th	7th	8th
A/P	56%	52%	66%
NI	41%	44%	29%
W/F	3%	4%	6%

Multiple Choice Test Results

Grade	n	Mean percent Correct 1st 12 week words Pre	Post
Six	29	65.09	77.82
Seven	46	68.20	82.75
Eight	64	74.67	85.02
Six	104	68.28	77.02
Seven	109	72.24	79.04
Eight	120	75.03	83.96

Multiple Choice Test Results

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Six	29	65.09	**77.82**
Seven	46	68.20	82.75
Eight	64	**74.67**	85.02
Six	104	68.28	**77.02**
Seven	109	72.24	79.04
Eight	120	**75.03**	83.96

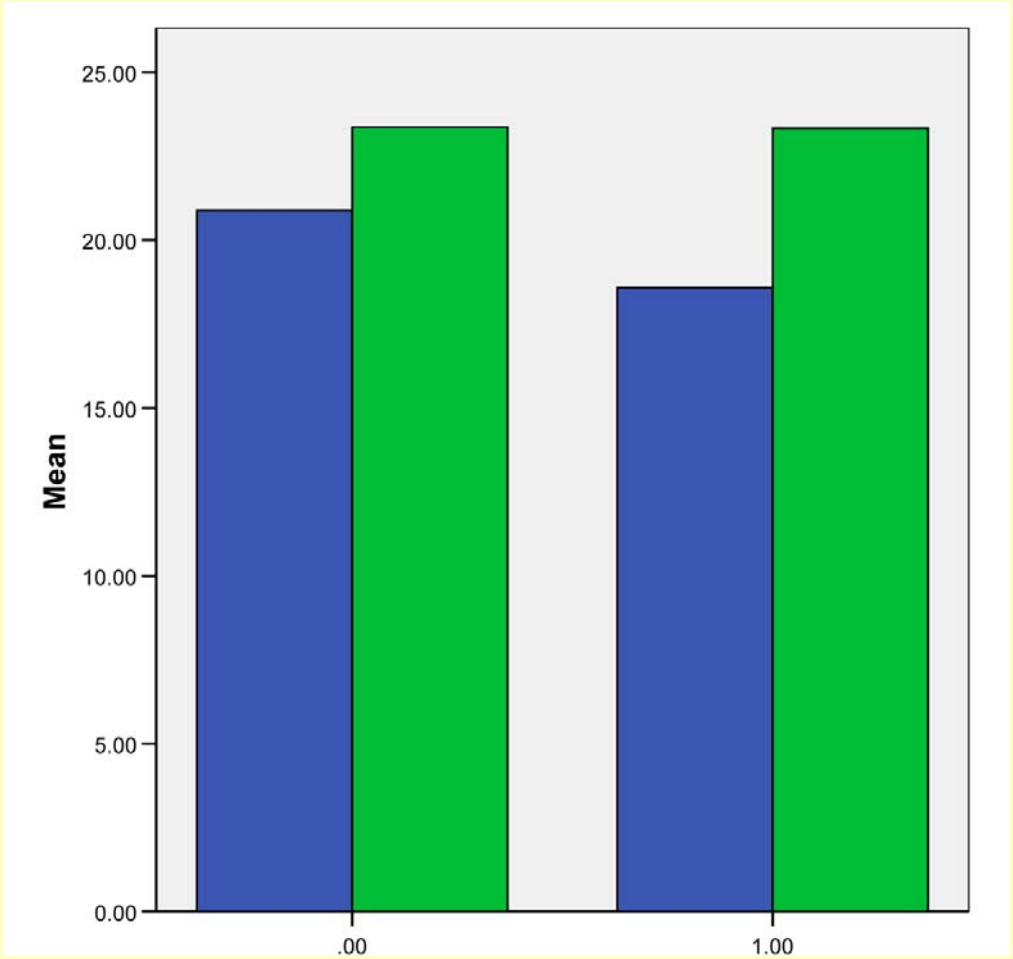
Intervention Effect Sizes by Grade, all words year 1 (using pooled SD)

	Westfield	Reilley
Grade 6:	0.45	0.25
Grade 7:	0.57	0.33
Grade 8:	0.71	0.45

Year 2 results, 6 schools

Treatment Status	Pre Test		Post Test		Gain
	Mean	SD	Mean	SD	
Comparison Group (N=294)	21.02	6.20	22.97	7.15	1.95
Treatment Group (N=632)	18.53	6.17	22.93	7.33	4.4

Year 2 results, 6 schools



Word Re-Generation

- Changes made during year one
  - Math problems: MCAS adapted
  - Teacher materials: streamlined
- Changes made in year two
  - Much more focus on academic discussion (Cathy O'Connor
  - Website designed (Matt Ellinger)
- Changes made in year three
  - Science activities upgraded

Academic Discussion

- Academically productive talk (APT)
  - Conceptually rich
  - Personally engaging
  - Interpersonally responsive
- Key moves in supporting APT
  - Revoicing
  - Students revoicing one another
  - Requiring warrants
- Key conditions for APT
  - Classroom discussion rules
  - Talk about issues not people

New Science Activities: Week 6 Learning in your sleep

Disclaimer: This is a fictitious experiment with fictitious data. It should not be attempted or replicated in any way. Professor Lexie Kahn and Professor Paul E. Seemy are Word Generation characters and not real scientists.

Background Information: Professors Seemy and Kahn overheard their students talking about how hard it was to find time to study. One student said he wished that he could study while he slept. Professor Kahn began to wonder if you could learn something while you slept. First, they had to identify ways students could access information while they slept. They quickly eliminated books as a source, but considered DVDs and MP3 players. They decided to try MP3 players to see if students could learn a new language while they slept.

Question: Does listening to a digital recording of a lesson on an MP3 player while you sleep help you learn?

New Science Activities: Week 6 Learning in your sleep

Hypothesis: Listening to a digital recording of Russian while you sleep will help you learn.

Materials:

Digitally recorded Russian lesson (basic words: mother, father, sister, brother and counting 0-10)

Test of Russian vocabulary (same as those taught in lesson)

Procedure:

Adminster to 60 students a pre-test in Russian. Record results.

Teach all of the students the Russian vocabulary words.

Divide the students into 3 groups. The first group will not study at all. The second group will study the vocabulary words. The third group will listen to the recording on an MP3 player while they sleep.

Administer the same post-test the next morning.

New Science Activities: Week 6 Learning in your sleep

	Average Score on Pretest - # correct of 15	Average Score on Post-test - # correct of 15
Did not study	2/15	4/15
Studied	2/15	12/15
Listened to recording	2/15	10/15

Concluding discussion

Was the hypothesis correct?

What evidence supports your conclusion?

Criteria for Effective Implementation of WG

- Student Level
  - Learning and using the Word Generation words
  - Improved understanding of content-area vocabulary and texts
  - Improved performance on MCAS
  - Improved world knowledge and writng
- Teacher Level
  - Improved knowledge of effective vocabulary strategies
  - Increased sense of responsibility for teaching content through language and language through content
  - Livelier classroom discussions with more accountable talk
- School Level
  - Improved trust and internal accountability
  - Greater involvement by principals in instruction
  - Shared commitment to developing and sustaining a school-wide literacy culture

Strategic Education Research Partnership

Basic SERP Principles and Word Generation

- Urgent problems of practice
- Defined in ways susceptible to practitioner input
- Upstream and downstream movement of knowledge
- Student, teacher, and organizational learning
- School-based, not academic, time-line
- Local solutions that travel
- Comprehension in middle school
- Vocabulary
- Teacher consultation and research base
- Curriculum, PD, collaboration across departments within schools
- Working real fast, processing teacher feedback in real time
- Red states and blue states

www.serpinstitute.org

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