# They Don't Know What? Understanding and Addressing the Hidden Needs of Many Adults

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Art Graesser, Jan Frijters,
Lee Branum-Martin

IES PI Meeting, Washington DC, December 11, 2015

# Funding Source

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# **Why?**

1/6 adults in the US read at elementary levels (PIAAC 2013). This impacts:

- correspondence with schools

- health

- workplace

# Mission

CSAL is committed to understanding the reading-related characteristics that are critical to helping adult learners reach their reading goals and to developing instructional approaches that are tailored to adult learners' needs and interests.

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# CSAL Projects

- Assessment of adults' reading and reading related skills

- Refinement and development of a multiple-component reading intervention that includes a web-based, animated, e-tutor.

- Pilot testing of the reading intervention.

- Supplemental studies.

- Dissemination activities.


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# Assessment

- To clarify the appropriateness of the use of a wide array of standardized reading, motivational, and cognitive assessments with adult literacy learners.

- To provide clarity on the cognitive and motivational profiles of adult literacy learners.

# **Participants**

500 Adult Literacy Students

- ❑ 250 in Toronto, 250 in Atlanta

- ❑ Reading between 3rd and 8th grade levels

- ❑ Non-native speakers and native speakers



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# Tests

**37 Tests and Surveys**

- ❑ Phonology
- ❑ Morphology
- ❑ Decoding
- ❑ Word Reading
- ❑ Fluency
- ❑ Vocabulary
- ❑ Written Comprehension
- ❑ Oral Comprehension
- ❑ Memory
- ❑ General Information/Academic Knowledge
- ❑ Reasoning
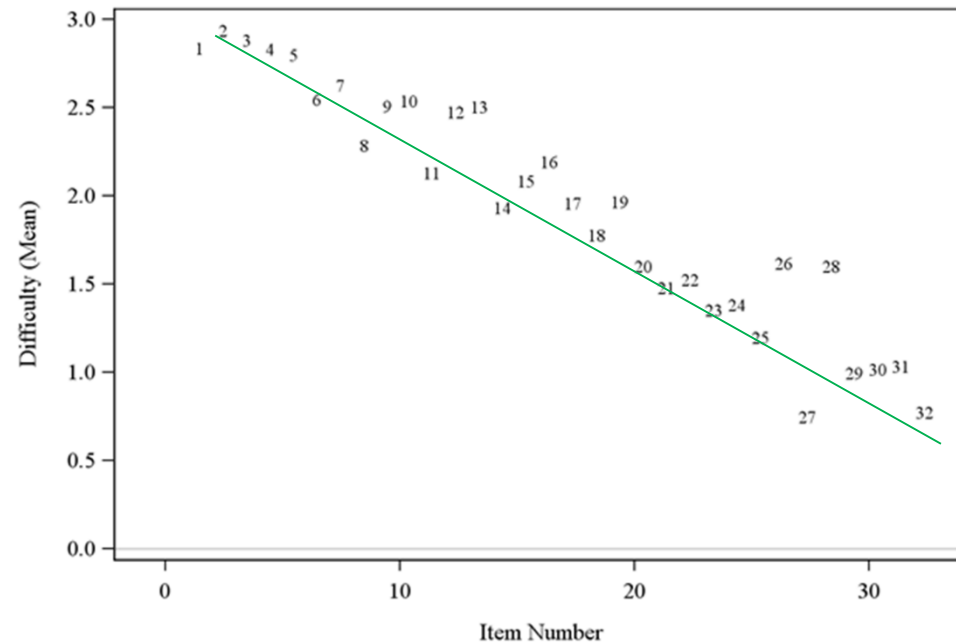- ❑ Motivation, Computer Familiarity, Demographics

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Language : CELF Recalling Sentences — Discrimination
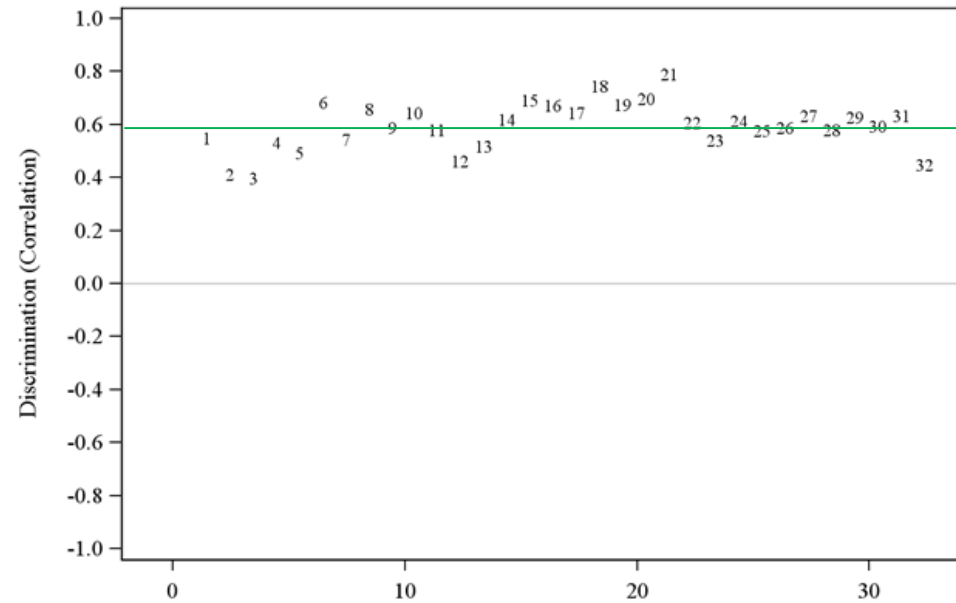


Language : CELF Recalling Sentences — Difficulty

## Preliminary Item Analyses (n = 115)

**High, consistent discrimination**

**Consistent ordering, easy to difficult**

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**Preliminary Item Analyses
(n = 115)**

**Good discrimination in the middle, low at the ends**
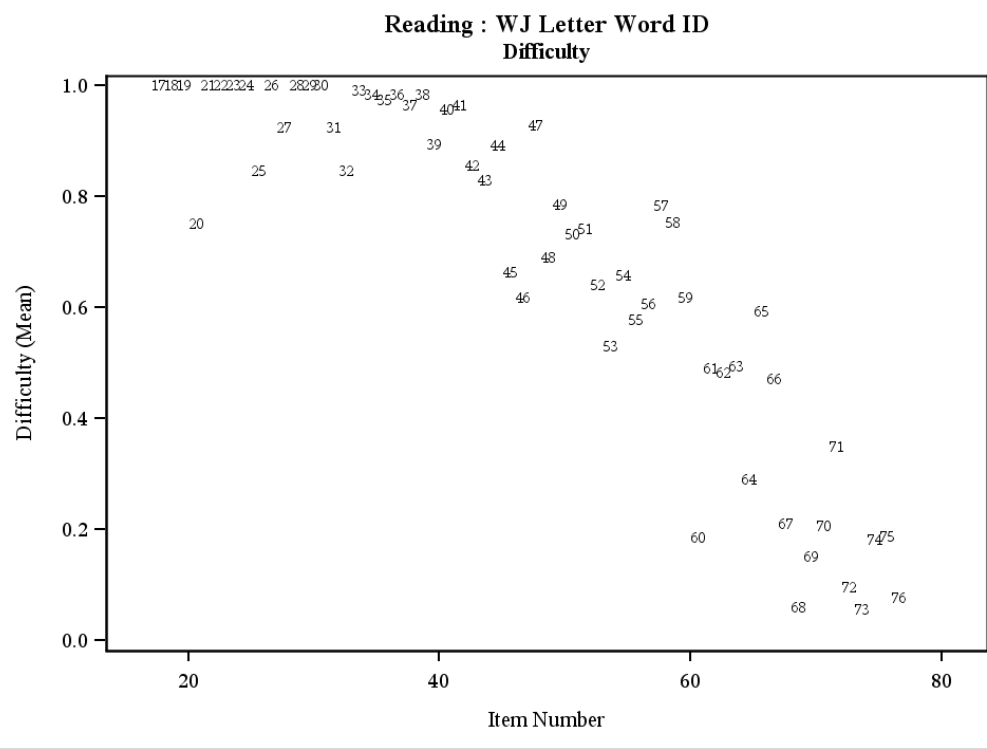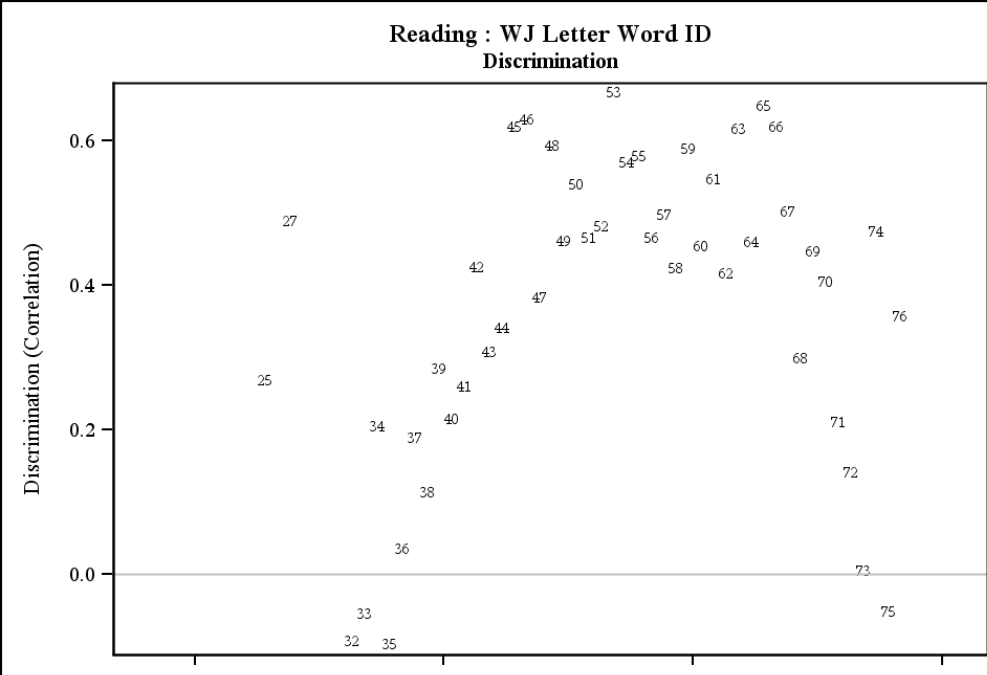
**Reasonable ordering, something of a floor effect.**

**Preliminary Item Analyses (n = 115)**

**Poor discrimination**

**Reasonable ordering.**
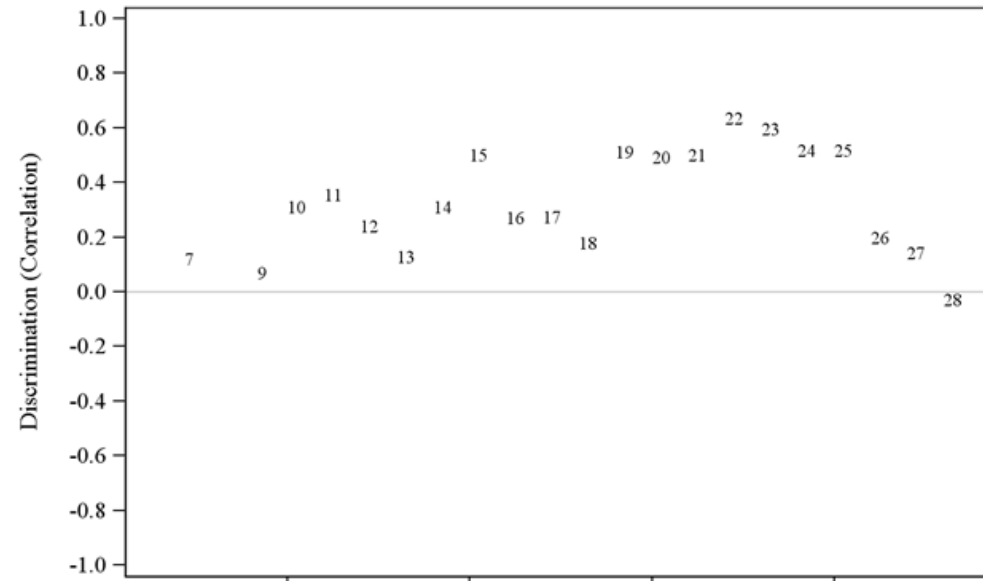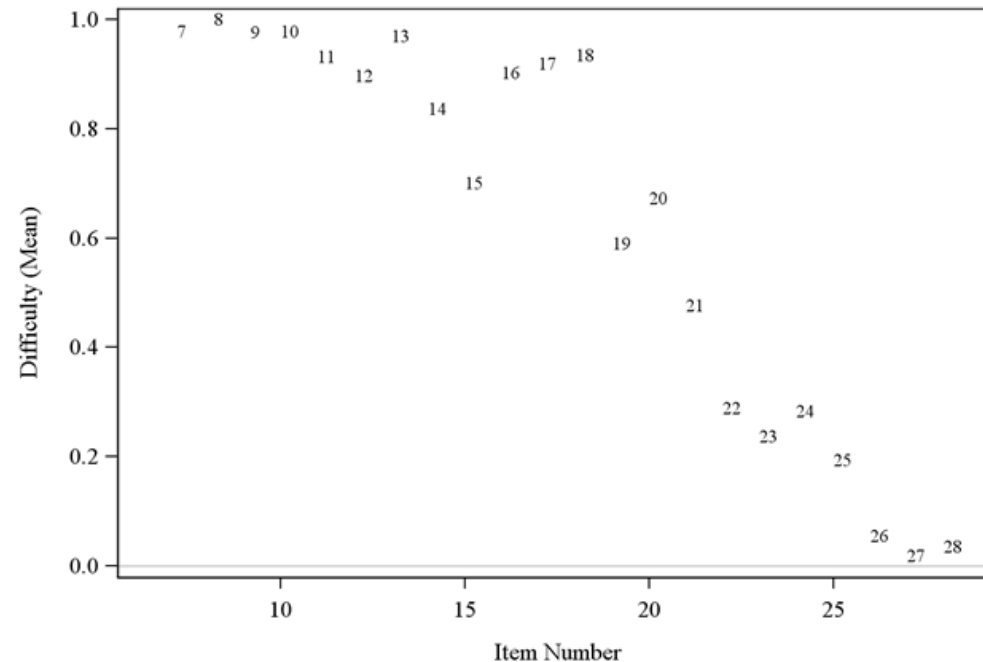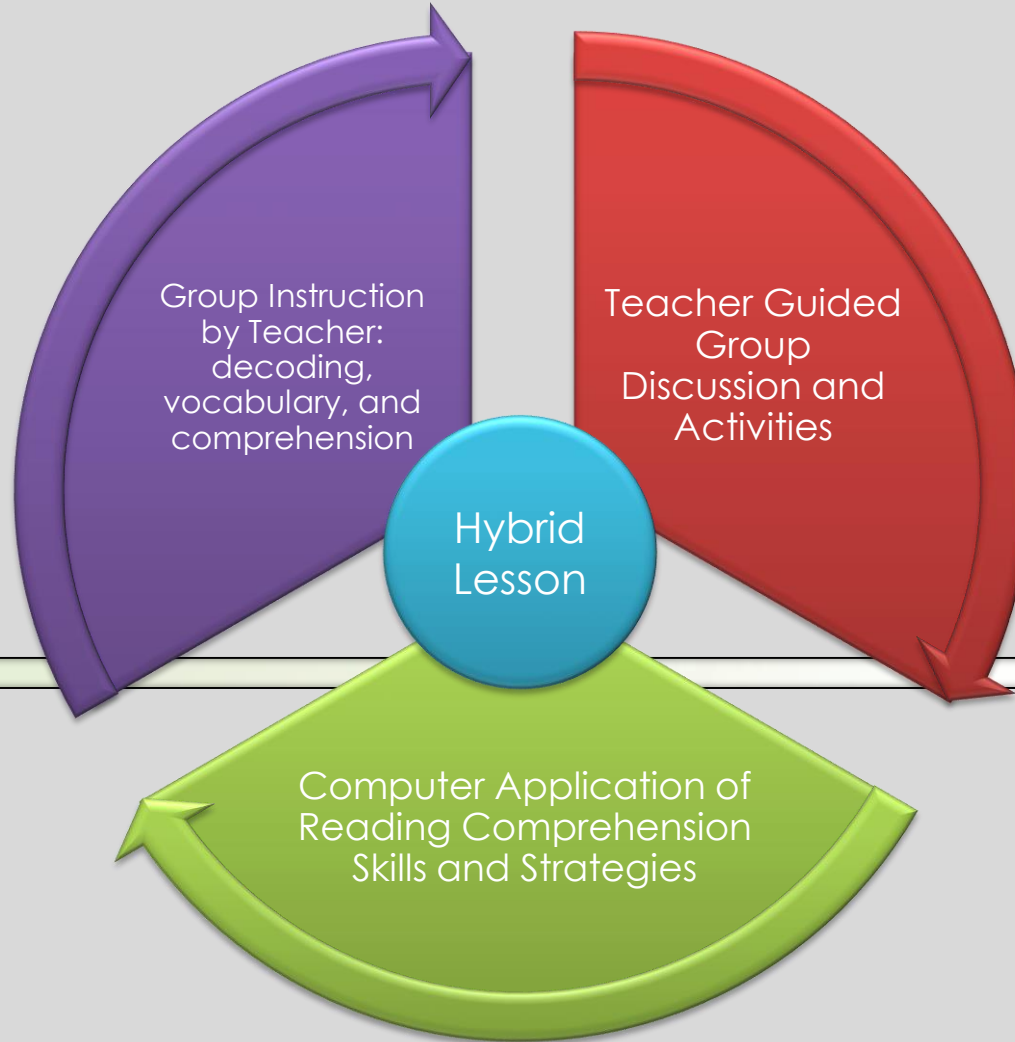
# Refinement and Testing of Intervention

- Iterative Development of Intervention

- Feasibility Study

  - January-June 2015

  - 52 adults: 32 in Canada and 20 in US

  - Mean age 41 years, majority female, African American/Canadian, native speakers of English, non high school graduates

# Intervention Components

- Human instruction in decoding

- Human instruction in comprehension

- AutoTutor

- Independent Reading

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CLASSROOM: Adult PHAST PACES

Group Instruction by Teacher: decoding, vocabulary, and comprehension

Teacher Guided Group Discussion and Activities

Hybrid Lesson

Computer Application of Reading Comprehension Skills and Strategies

COMPUTER: AutoTutor

# The starting point

- Effective instruction starts with an evidence-based model of *what is involved* in becoming a skilled reader.

- What must be learned in acquiring basic reading and comprehension skills?

- What must be in place to develop a fluent reading system?

- Do adults follow a different route to building a reading brain, or are the developmental pathways essentially the same?

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# Learning that is multidimensional and a focus that changes over time

**LANGUAGE COMPREHENSION**

**BACKGROUND KNOWLEDGE**
(facts, concepts, etc.)

**VOCABULARY**
(breadth, precision, links, etc.)

**LANGUAGE STRUCTURES**
(syntax, semantics, etc.)

**VERBAL REASONING**
(inference, metaphor, etc.)

**LITERACY KNOWLEDGE**
(print concepts, genres, etc.)

**WORD RECOGNITION**
**PHONOLOGICAL AWARENESS**
(syllables, phonemes, etc.)

**DECODING (alphabetic principle, spelling-sound correspondences)**

**SIGHT RECOGNITION**
(of familiar words)

*increasingly strategic*

*increasingly automatic*

**SKILLED READING:**
Fluent execution and coordination of word recognition and text comprehension.
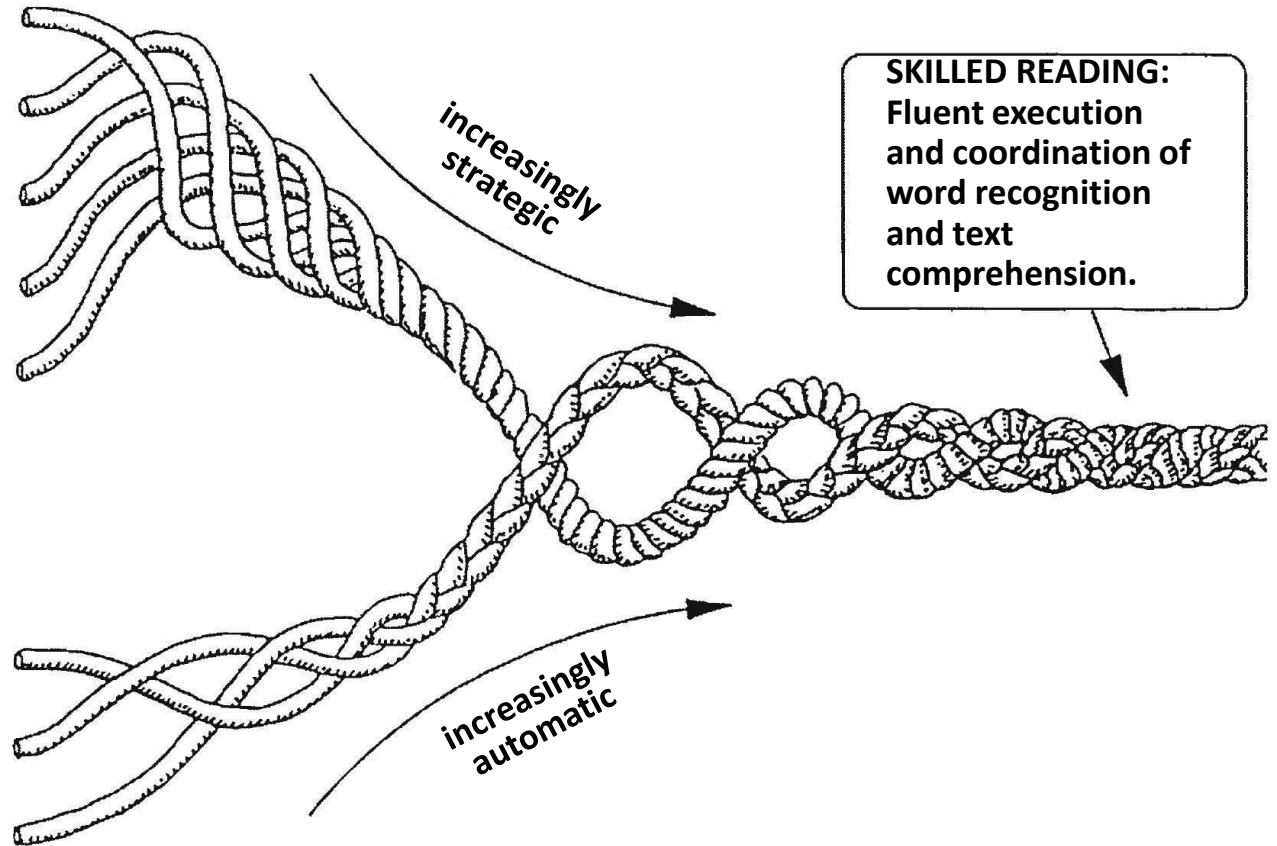
**Hollis Scarborough (2003)**

# The starting point

Effective instruction builds upon
solid research evidence on what helps
older struggling readers improve basic literacy skills

**Reading Intervention in High School**

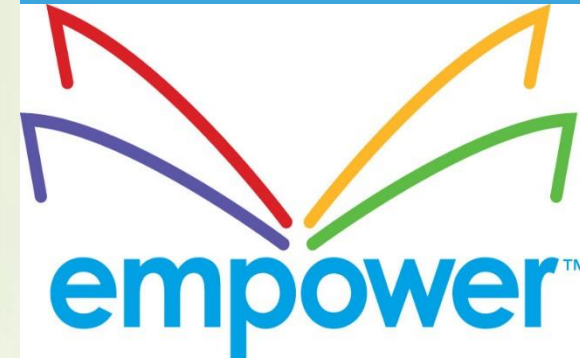A Literacy Intervention Program for teens reading
between the 3rd and 5th grade levels

Designed to specifically address
literacy learning problems in adolescents

**More than 3000 struggling readers have
received instruction in Canadian high schools**

PHAST PACES is the research version of Empower™ Reading High School

# Using an effective reading intervention for struggling adolescent readers as an instructional springboard

## Empower™ Reading: High School
## An intervention for struggling readers in high school

**80 Hours of Instruction**
(60 Minute Lessons)

**Decoding Track**
(30 Minutes)

**Text Knowledge Track**
(15 Minutes)

**Comprehension Strategy Track**
(15 Minutes)

(Lovett, Lacerenza, De Palma, & Frijters, *JLD*, 2012)

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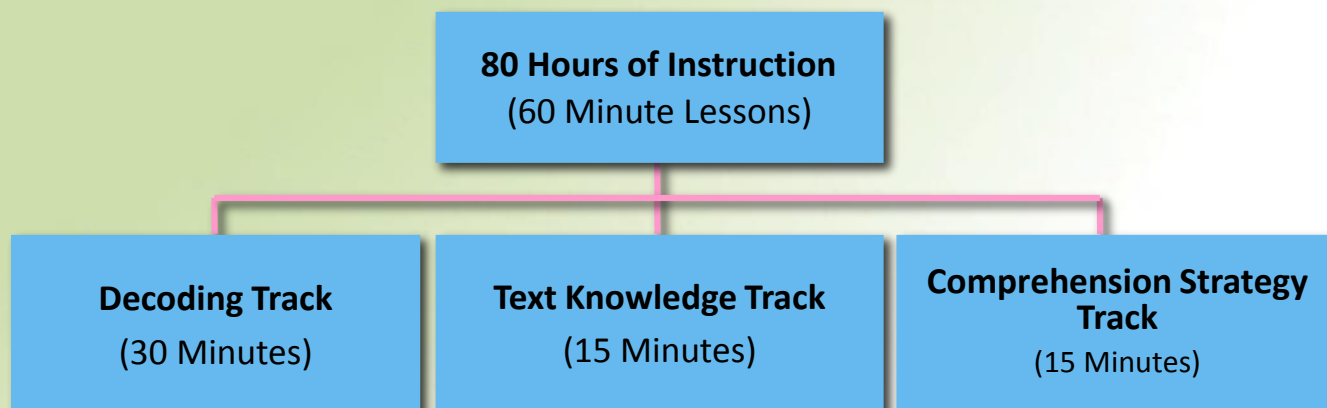
# Findings from Our High School Study

- Significant gains on standardized word attack, word reading, and passage comprehension tests following PHAST PACES

- Significant gains in letter-sound knowledge and multisyllabic word identification

- Average effect size of .68 across outcomes

- At one year follow-up, passage comprehension showed continued growth

- Variability of outcomes among high school participants

(Lovett, Lacerenza, De Palma, & Frijters, *JLD*, 2012)

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# Adult PHAST PACES
## CSAL's Teacher-Led Group Instruction Programs

### Adult PHAST Program

- ❑ Flexible strategies for decoding unfamiliar words
- ❑ Addresses gaps in letter-sound knowledge (*igh, ea, ie*)
- ❑ Identifying multisyllabic words with greater ease

### Adult PACES Program

- ❑ Strategies to predict author's purpose, acquire new vocabulary, and clarify confusion in text
- ❑ Promotes deeper comprehension through evaluating, elaborating, and summarizing from text
- ❑ Offers training in research and internet skills for learners at higher levels



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# Peeling Off Strategy

**Goal:**
- Teach affix preskills necessary for successful strategy application (reading and spelling)

**Skills for multisyllabic words:**
- Identifying and articulating affixes
- Blending and segmenting syllables
- Strategy steps and dialogue
- Application to text reading

**Concepts:**
- Affix(es) can be 'peeled off' and root remains
- Multiple affixes must be connected
- Be flexible with variable affix pronunciations

**Worksheet application:**
- Prefix and suffix practice/dictation; word and sentence reading/dictation

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# Vowel Alert Strategy

**Goal:**
- Teach learners to be flexible with single vowel and vowel team sounds for successful strategy application

**Skills for multisyllabic words:**
- Recognizing and articulating the variable sounds of single vowels and vowel teams—and c, g, gh, ch effects
- Consonant teams—tch, dge
- Strategy steps and dialogue
- Application to text reading

**Concepts:**
- Flexibility with variable vowel sounds
- c and g alert; gh and ch alert

**Worksheet application:**
- Variable sound practice/dictation; word and sentence reading/dictation

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# Adult PACES Comprehension Program

**P** Predicting Purpose with Text Signals and Key Information.

**A** Acquiring Vocabulary with Context Clues.

**C** Clarifying Common Sources of Confusion with Clarifying Questions.

**E** Evaluating and Elaborating through Questioning.

**S** Summarizing with Text Maps.

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# Lesson Anatomy
## Utilizing Gradual Release of Responsibility Principles

**EXPLANATION**
- Clear discussion as to the skills and strategies that will be taught in the lesson.

**JUSTIFICATION**
- Discussing the utility and benefits of the skills and strategies taught.

**MODEL EXAMPLE(S)**
- Instructor lead demonstrations of the skills and strategies.

**GROUP EXAMPLES(S)**
- Instructor guided demonstrations where the instructor encourages correct responses and interjects as needed.

**INDIVIDUAL PRACTICE**
- Independent applications of the skills and strategies taught on a computer running the AutoTutor adult literacy computer program.

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# Relating reader and writer

**Reading is a conversation between the reader and writer. It is up to the writer to pass on information in a clear way, and it is up to the reader to engage with the writer's ideas and make sense of the information.**
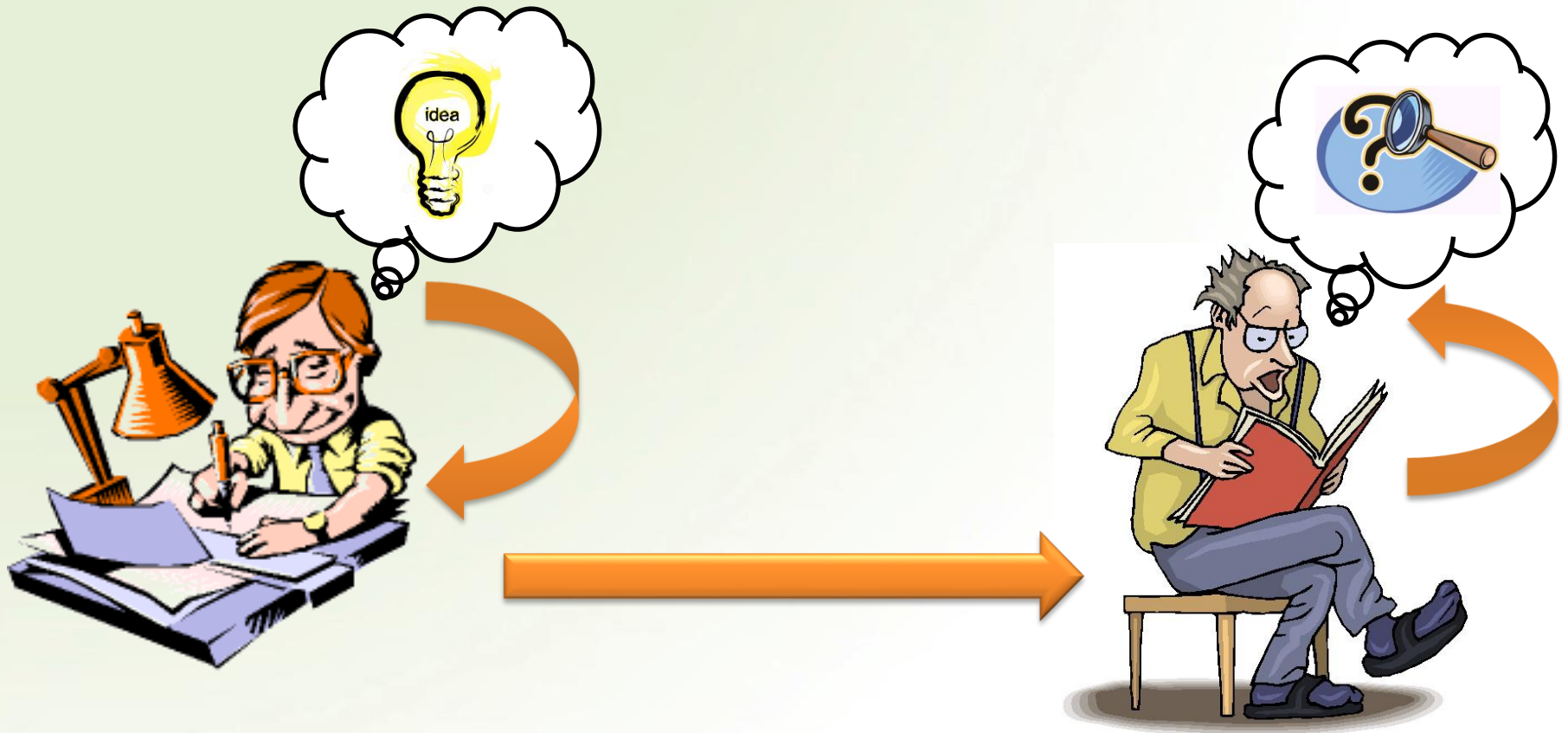
# Common Sources of Confusion

- Pronouns
- Unfamiliar words and jargon
- Multiple Meaning words
- Nonliteral language
- Contradictions
- Ambiguous words/phrases

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To evaluate our understanding of <u>informative</u> texts, we ask ourselves:

What is the topic?

What is the main idea?

What information supports the main idea?

## Computers: Faster than the Speed of Byte
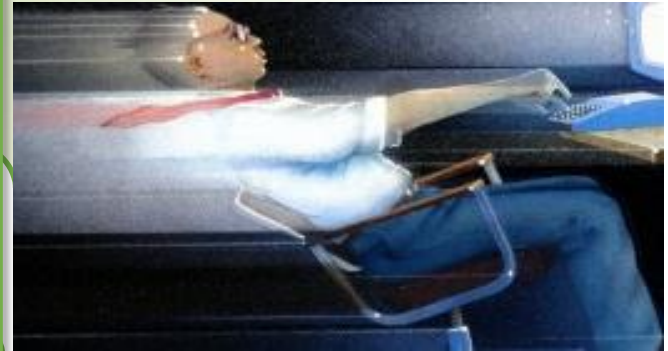
Computers are very valuable machines because they work so fast. In the time it takes to push a few buttons, a bank manager can develop a mortgage payment plan for a potential home owner. Within seconds, telephone computers connect thousands of callers around the world. Long and difficult mathematical problems can be solved in milliseconds.

**S** Informational, Persuasive vs. Narrative Text

**Ways to determine text type:**

1. **Ask yourself 'Is this...**

❑ *'...telling me a story?'*
❑ *'...giving me information?',*
❑ *'...stating an argument?'*

2. **Look for Key information.**

❑ Informative texts will be packed with *facts*.
❑ Persuasive texts will have both *facts* and *opinions*.
❑ Narrative texts will contain many *emotion triggers*.

| Key Information | Writer's Purpose | Reader's Purpose |
|---|---|---|
| Facts | Inform | To learn |
| Opinions | Convince | To choose |
| Emotion Triggers | Entertain | To enjoy |

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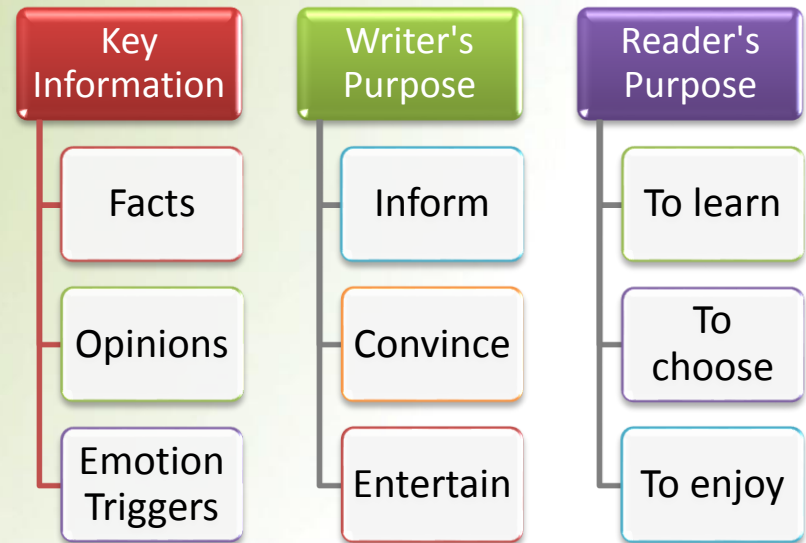
- Statement and Explanation
- Problem and Solution
- Cause and Effect
- Compare and Contrast
- Description and Spatial
- Order: Time and Importance
- Procedural

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# Building Bridges

**E** Elaborating Through Questioning

**Elaborating means adding to what is directly stated in a text. To do this we ask questions that help us make inferences.**

**Work It Out**
- *What is the writer suggesting here?*
- *Why is the writer telling me this?*

**Uncover the Message**
- *What are we supposed to learn from this text?*
- *What main messages is the writer trying to get across?*

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# Evaluating the Author Through Questioning

Reading is a conversation between the reader and writer. Sometimes, writers do a good job of explaining something, but other times, they do not. So as we are reading, we should *Question the Writer* for clarity, quality, and credibility.

# E+  Evaluating the Writer Through Questioning
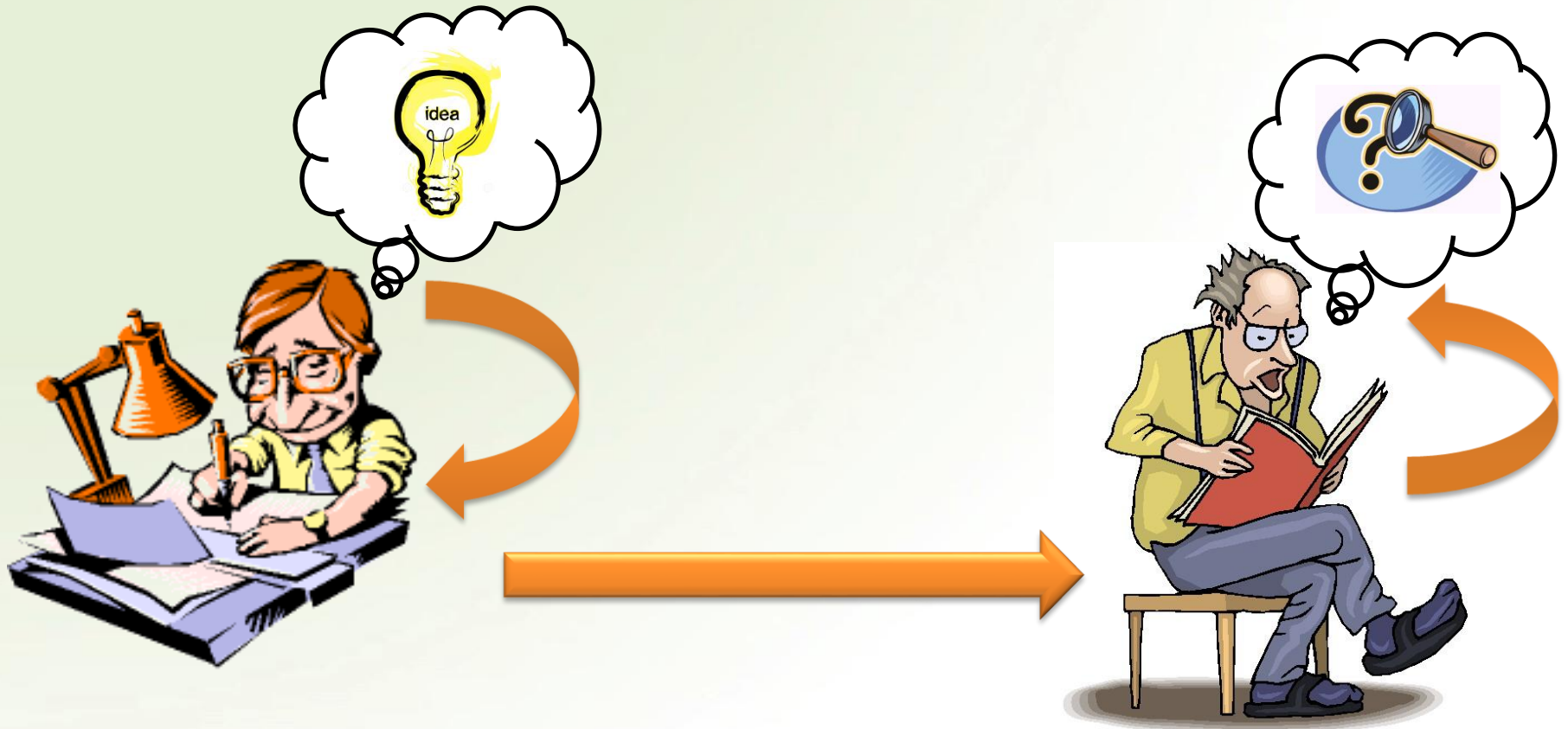
Sometimes, writers do a good job of explaining something; other times, they do not. We can *Question the Writer* for clarity, quality, credibility.

## Check for Clarity, Organization and Quality

- Does the writer explain this information or argument clearly?
- How could the writer have explained things more clearly?
- How well is the text organized?
- How well are the ideas connected to each other? Does the text flow? Does the text make sense?
- What are the flaws in this text?
- How could the writer improve this text?
- What are the strengths of this text?

## Check the Writer

- Who is the writer?
- What are the writer's credentials?
- Is the writer an expert?

## Check the Source

- Where did the text come from?
- Is the text self-published or professionally published?
- When was the text written?

## Check for Bias

- What is the bias towards?
- Is the writer transparent about their bias?

## URL Knowledge

**.com - commercial** (i.e. dictionary.com)

**.edu - education** (i.e. csal.gsu.edu)

**.gov - government** (i.e. usa.gov)

**.org - organization** (i.e. wikipedia.org)
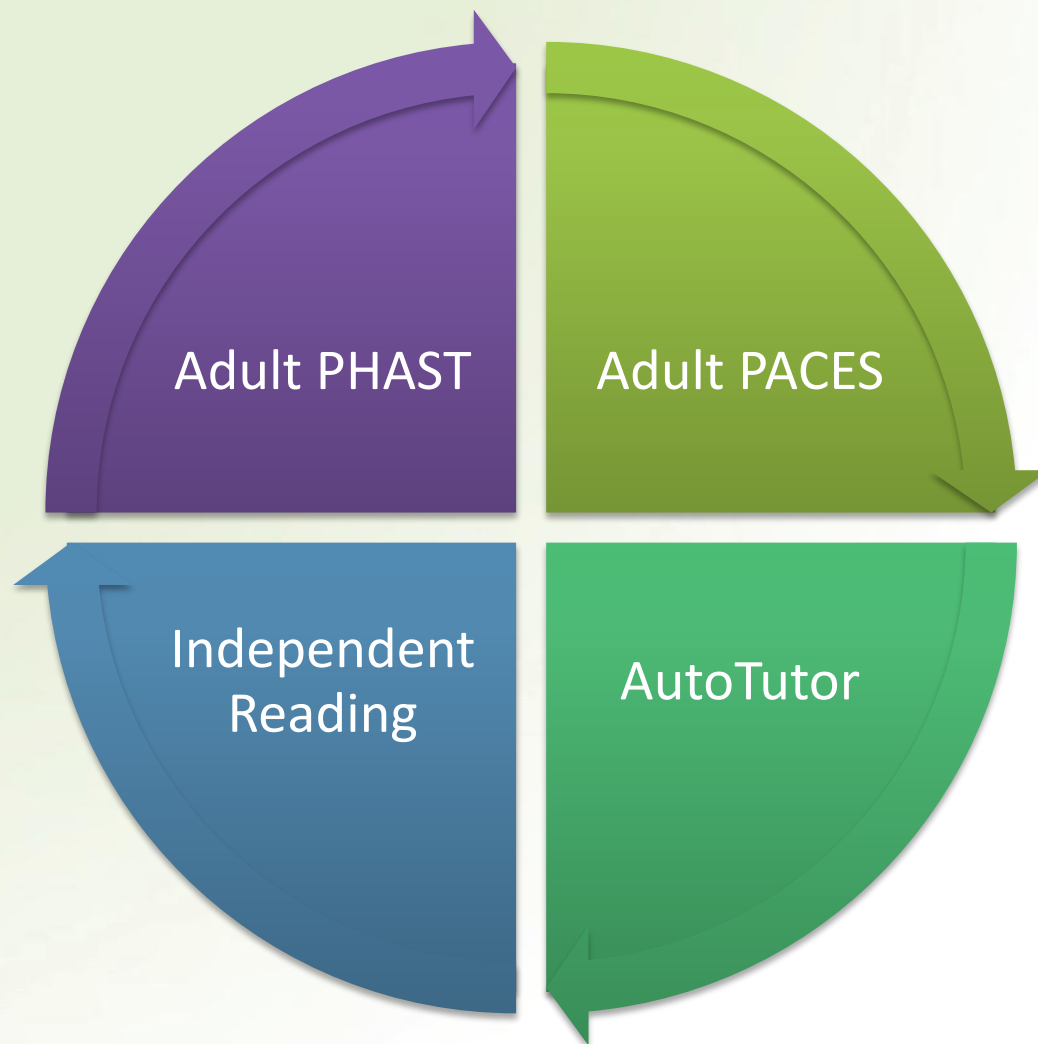
**.net - network** (i.e. slideshare.net)

**.us – United States** (i.e. vote.us)

**.ca – Canada** (i.e. google.ca)

**.uk – United Kingdom** (i.e. google.co.uk)

**.au – Australia** (i.e. google.com.au)

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# Initial Program Components

# Program Components

CLASSROOM: Adult PHAST PACES

Group Instruction by Teacher: decoding, vocabulary, and comprehension

Teacher Guided Group Discussion and Activities

Hybrid Lesson

Computer Application of Reading Comprehension Skills and Strategies
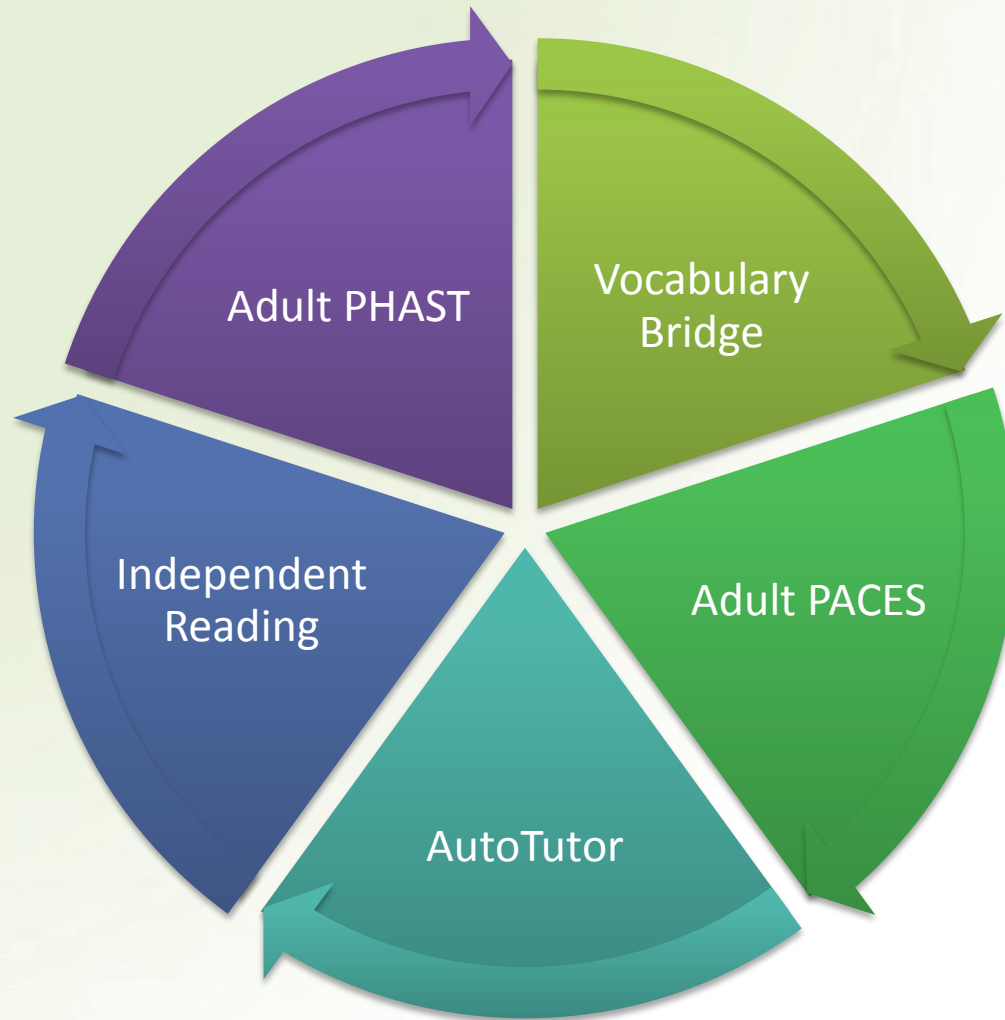
COMPUTER: AutoTutor

# AutoTutor Highlights

- **Conversation Patterns**
  - Interacts with students by questioning, hinting, eliciting information, filling in gaps, correcting the student
  - Direct and indirect feedback
  - Intelligent conversational scaffolding
- **Multiple Agents (Trialogs)**
  - Human, student agent, and teacher agent
  - Vicarious learning, interactive tutoring, versus learning by teaching
  - Tutoring modes: Helping the peer, game competition, and authentic contexts rather than schoolish drill
- **Evaluating and Responding to Student Contributions**
  - Individualized instruction by responding adaptively to the student's answers
  - Content knowledge, skills, strategy use, emotions, motivation
  - Advances in computational linguistics
- **Multiple Media**
- **Practical Texts and Tasks for Adults**

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## Are you new? Click HERE!

## I have used CSAL. Click HERE!

# Typing tutorial instructs students how to use a keyboard

# Scope and Sequence of PACES Adult Comprehension Program

| | |
|---|---|
| Lesson 0 | Introduction to Program/Orientation |
| Lesson 1 | Predicting Using Text Signals |
| Lesson 2 | Predicting the Writer's Purpose |
| Lesson 3 | Predicting the Writer's Purpose in Hybrid Texts |
| Lesson 4 | Affixes |
| Lesson 5 | Punctuation Pre Skills for Acquiring |
| Lesson 6 | Word Types and Context Clues |
| Lesson 7 | Acquiring Words Strategy |
| Lesson 8 | Clarifying: Multiple Meaning Words |
| Lesson 9 | Clarifying: Pronouns |
| Lesson 10 | Clarifying: Non Literal Language |
| Lesson 11 | Review (PAC) |
| Lesson 12 | Differentiating Between Narrative, Informational, Persuasive Texts Using Key Information |
| Lesson 13 | Questioning Strategy: Narrative Texts |
| Lesson 14 | Bridge Building in Narratives |
| Lesson 15 | Summarizing Narratives Using a Plot Graph |

| | |
|---|---|
| Lesson 16 | Questioning Strategy: Informative Texts |
| Lesson 17 | Questioning Strategy: Persuasive Texts |
| Lesson 18 | Review of the Evaluating Strategy |
| Lesson 19 | Statement and Explanation |
| Lesson 20 | Problem Solution |
| Lesson 21 | Cause and Effect |
| Lesson 22 | Description and Spatial |
| Lesson 23 | Compare and Contrast |
| Lesson 24 | Time Order, Order of Importance |
| Lesson 25 | Procedural |
| Lesson 26 | Review of Text Structures |
| Lesson 27 | Elaborating on Narrative Texts |
| Lesson 28 | Elaborating on Informative Texts through Questioning |
| Lesson 29 | Elaborating on Persuasive Texts through Questioning |
| Lesson 30 | Looking at Documents/Question and Answer Structure |

# Video



**Click this image to view the video on YouTube**

# Teacher's Access Page Database
## Class View

CSAL Teachers' View    LESSONS   **CLASSES**   STUDENTS   TEACHING MATERIALS     WHITNEY.BAER@GMAIL.COM (ADMIN)

## CSAL Database Application  Class lai

| Meeting Time | TR 9-12 |
| --- | --- |
| Students | 10 |
| Lessons | 31 |

Location: atlanta

hagley764@gmail.com; dgreenbergsu@gmail.com

Please note that averages are based on the students' *last* attempt on a lesson. You may examine all attempts a student has made by clicking on a score.

**Lessons** (callout pointing to Lesson column)

**Student in class** (callout pointing to student columns)

## Lesson Breakdown

| Lesson | Class Avg | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0. Introduction | | | | | | | | | | | |
| 1. Text Signals | 77% | 76% ✔ | 79% ✔ | 66% ✔ | 68% ✔ | 76% ✔ | 84% | 94% | 72% ✔ | 91% ✔ | 78% |
| 2. Writer's Purpose | 62% | 65% ✔ | 59% | 53% ✔ | 68% ✔ | 71% ✔ | 63% ✔ | 63% ✔ | 62% ✔ | 69% ✔ | 54% ✔ |
| 3. Hybrid Texts | 81% | 76% ✔ | 79% ✔ | 73% ✔ | 87% ✔ | 87% ✔ | 79% ✔ | 93% | 95% | 73% ✔ | 79% ✔ |
| 4. Affixes | 69% | 75% ✔ | 75% ✔ | 72% ✔ | 91% ✔ | 58% ✔ | 72% ✔ | 79% | | 61% ✔ | 59% ✔ |
| 5. Punctuation | 71% | 92% | 92% | 75% | 77% | 57% | 50% ✔ | 83% | 83% | 89% | 57% ✔ |
| 6. Context Clues | 70% | 63% | 68% | 68% | 69% | 83% | 62% | 100% | 79% ✔ | 73% ✔ | 60% |
| 7. Acquiring New Words | 75% | 64% ✔ | 70% ✔ | 66% | 80% ✔ | 75% ✔ | 75% ✔ | 90% ✔ | 100% ✔ | 75% ✔ | 75% ✔ |
| 8. Multiple Meaning Words | 0% ✔ | 0% | 0% ✔ | 0% | 0% ✔ | 0% ✔ | 0% | 0% ✔ | 0% ✔ | 0% |
| 9. Pronouns | 76% | 83% ✔ | 83% ✔ | 74% ✔ | 87% ✔ | 48% ✔ | 83% ✔ | 96% ✔ | 83% ✔ | 74% ✔ | 57% |
| 10. Non-Literal Language | 76% | 83% ✔ | 80% ✔ | 80% ✔ | 77% ✔ | 60% ✔ | 83% ✔ | 67% ✔ | 87% ✔ | 67% ✔ | 73% ✔ |
| 11. Review | 80% | 77% ✔ | 80% ✔ | 75% | 79% ✔ | 83% ✔ | 78% ✔ | 100% ✔ | 92% ✔ | 73% ✔ | 75% ✔ |
| 12. Using Key Information | 85% | 95% ✔ | 85% ✔ | 85% ✔ | 92% ✔ | 88% ✔ | 79% ✔ | 92% | 79% ✔ | 79% | 79% ✔ |
| 13. Questioning: Narrative | 66% | 60% ✔ | 20% ✔ | 60% ✔ | 80% ✔ | 0% ✔ | 80% ✔ | 80% ✔ | 100% ✔ | 80% ✔ | 100% ✔ |
| 14. Bridge Building | 58% | 46% | 62% ✔ | 42% ✔ | 81% ✔ | 33% ✔ | 54% ✔ | 70% ✔ | 68% ✔ | 50% ✔ | |
| 15. Summarizing Narrative | 55% | 58% | 63% | 38% ✔ | 70% ✔ | | 28% ✔ | 53% | 75% ✔ | 60% | 52% |
| 16. Questioning: Informational | 69% | 59% ✔ | 86% ✔ | 65% ✔ | 86% ✔ | 59% ✔ | 75% ✔ | 73% ✔ | 63% ✔ | 75% ✔ | 59% ✔ |
| 17. Questioning: Persuasive | 58% | 75% ✔ | 57% ✔ | 64% ✔ | 79% ✔ | 44% | | 43% ✔ | 52% ✔ | 59% ✔ | 58% ✔ |

# Teacher's Access Page Database
## Student Details

# AutoTutor CSAL Lessons, PACES curriculum and Theory Alignment

| P-A-C-E-S | Lesson | Theory | Mean Time Per Lesson (minutes) | % Completed Medium Level | % Correct Medium Level |
|---|---|---|---|---|---|
| P | 1. Text Signals | situation model | 34.0 | 86.0 | 77.0 |
| P | 2. Writer's Purpose | rhetorical structure | 36.8 | 69.1 | 54.6 |
| P | 3. Hybrid Texts | rhetorical structure, situation model | 36.1 | 94.0 | 78.0 |
| A | 4. Affixes | words | 37.7 | 91.3 | 50.5 |
| A | 5. Punctuation | syntax, situation model | 30.6 | 78.7 | 61.4 |
| A | 6. Context Clues | words | 43.8 | 82.6 | 68.9 |
| A | 7. Acquiring New Words | words | 30.8 | 89.1 | 84.6 |
| C | 8. Multiple Meaning Words | words, syntax | 13.0 | 91.7 | 81.9 |
| C | 9. Pronouns | text-based, words | 38.0 | 87.8 | 78.0 |
| C | 10. Non-Literal Language | situation model | 27.6 | 85.1 | 71.8 |
| P-A-C | 11. Review | situation model, words | 12.5 | 100.0 | 74.9 |
| E | 12. Using Key Information | text-based, situation model | 17.9 | 95.7 | 74.7 |
| E | 13. Questioning: Narrative | situation model, text-based, rhetorical structure | 14.0 | 90.9 | 75.7 |
| E | 14. Bridge Building | situation model, text-based, rhetorical structure | 23.4 | 77.8 | 60.0 |
| S | 15. Summarizing Narrative | situation model, rhetorical structure | 65.4 | 82.2 | 71.5 |
| E | 16. Questioning: Informational | text-based, rhetorical structure | 22.1 | 97.8 | 69.7 |
| E | 17. Questioning: Persuasive | text-based, rhetorical structure | 33.9 | 92.7 | 64.9 |
| P-A-C-E | 18. Review | situation model, text-based | 17.4 | 88.9 | 65.0 |
| S | 19. Statement and Explanation | rhetorical structure, text-based, situation model | 28.5 | 86.7 | 61.8 |
| S | 20. Problem Solution | rhetorical structure, text-based, situation model | 23.5 | 88.1 | 71.5 |
| S | 21. Cause and Effect | rhetorical structure, text-based, situation model | 63.4 | 77.3 | 55.8 |
| S | 22. Descripton and Spatial | rhetorical structure, text-based, situation model | 23.6 | 77.3 | 69.3 |
| S | 23. Compare and Contrast | rhetorical structure, text-based, situation model | 31.4 | 60.0 | 77.8 |
| S | 24. Time Order | rhetorical structure, text-based, situation model | 28.2 | 92.5 | 81.1 |
| S | 25. Procedural | rhetorical structure, text-based, situation model | 26.5 | 95.1 | 81.3 |
| P-A-C-E-S | 26. Review | rhetorical structure, text-based, situation model | 17.8 | 87.5 | 65.0 |
| E | 27. Elaborating: Narrative | situation model, textbased | 13.3 | 97.3 | 85.8 |
| E | 28. Elaborating: Informative | situation model, textbased | 43.8 | 81.6 | 67.1 |
| E | 29. Elaborating: Persuasive | situation model, textbased | 35.5 | 93.9 | 72.4 |
| E | 30. Documents | situation model, textbased | 26.5 | 67.7 | 69.4 |

# Highlights of AutoTutor Data

- Learning gains on comprehension level tests (*d* = 0.44)

- Curriculum components (P, A, C, E, S)
  - Question completion  (varied between 83% &  89%)
  - Answer accuracy (varied between 67% and 75%)

- Theory (Graesser, McNamara, Kintsch, Perfetti) (Words, Syntax, Textbase, Situation Model, Rhetorical Structure)
  - Question completion  (varied between 79% & 91%)
  - Answer accuracy (varied between 61% and 72%)

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# Feasibility Study Outcomes: Pen/Pencil Tests

❑ Reminder: Feasibility Study

  ❑ January-June 2015

  ❑ 52 adults: 32 in Canada and 20 in US

  ❑ Mean age 41 years, majority female, African American/Canadian, native speakers of English, non high school graduates

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# Standardized Pre-Post Gains across Multiple Outcomes
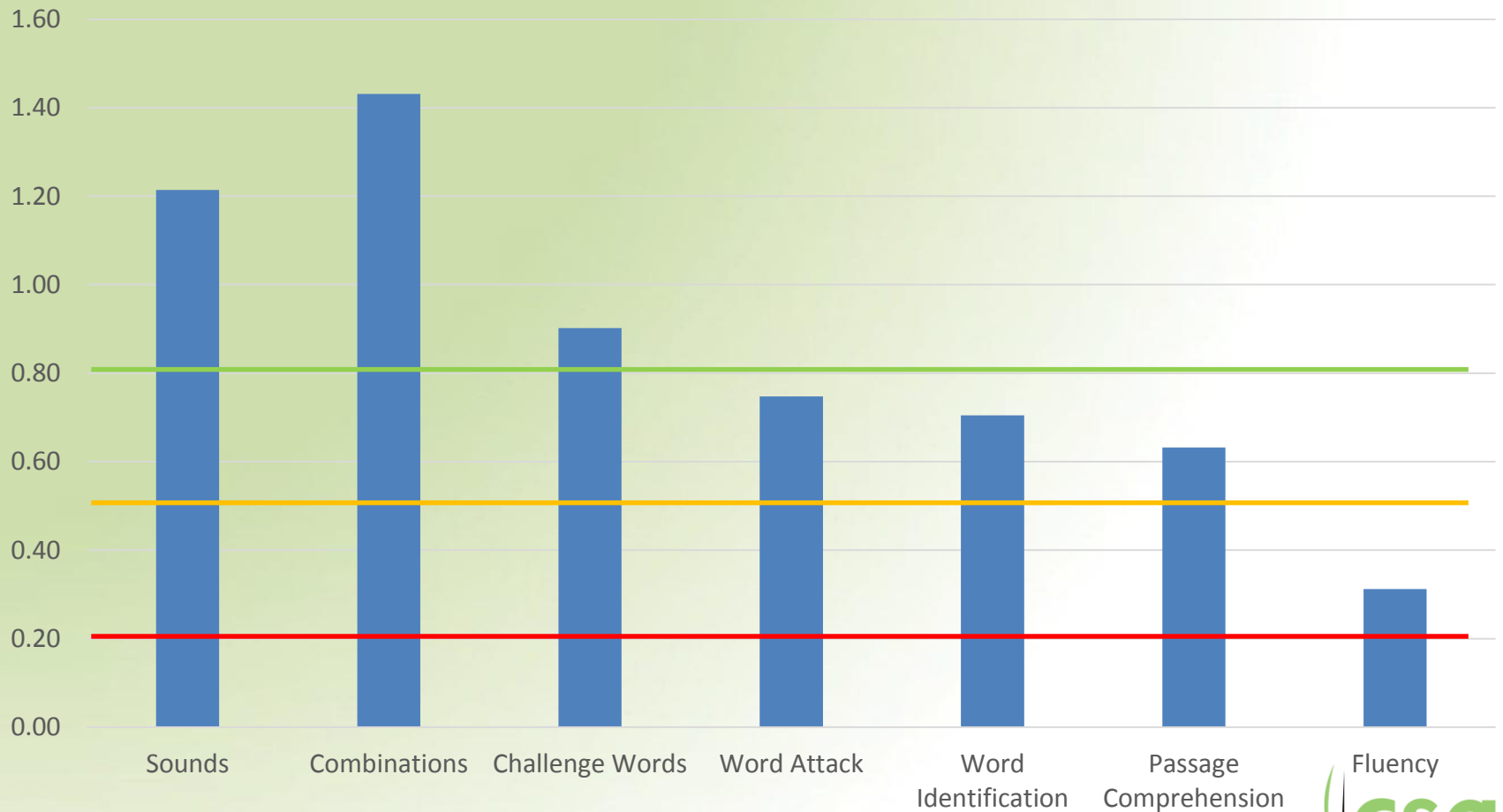
# Percent who made Statistically-Reliable Pre-Post Gains by Measure



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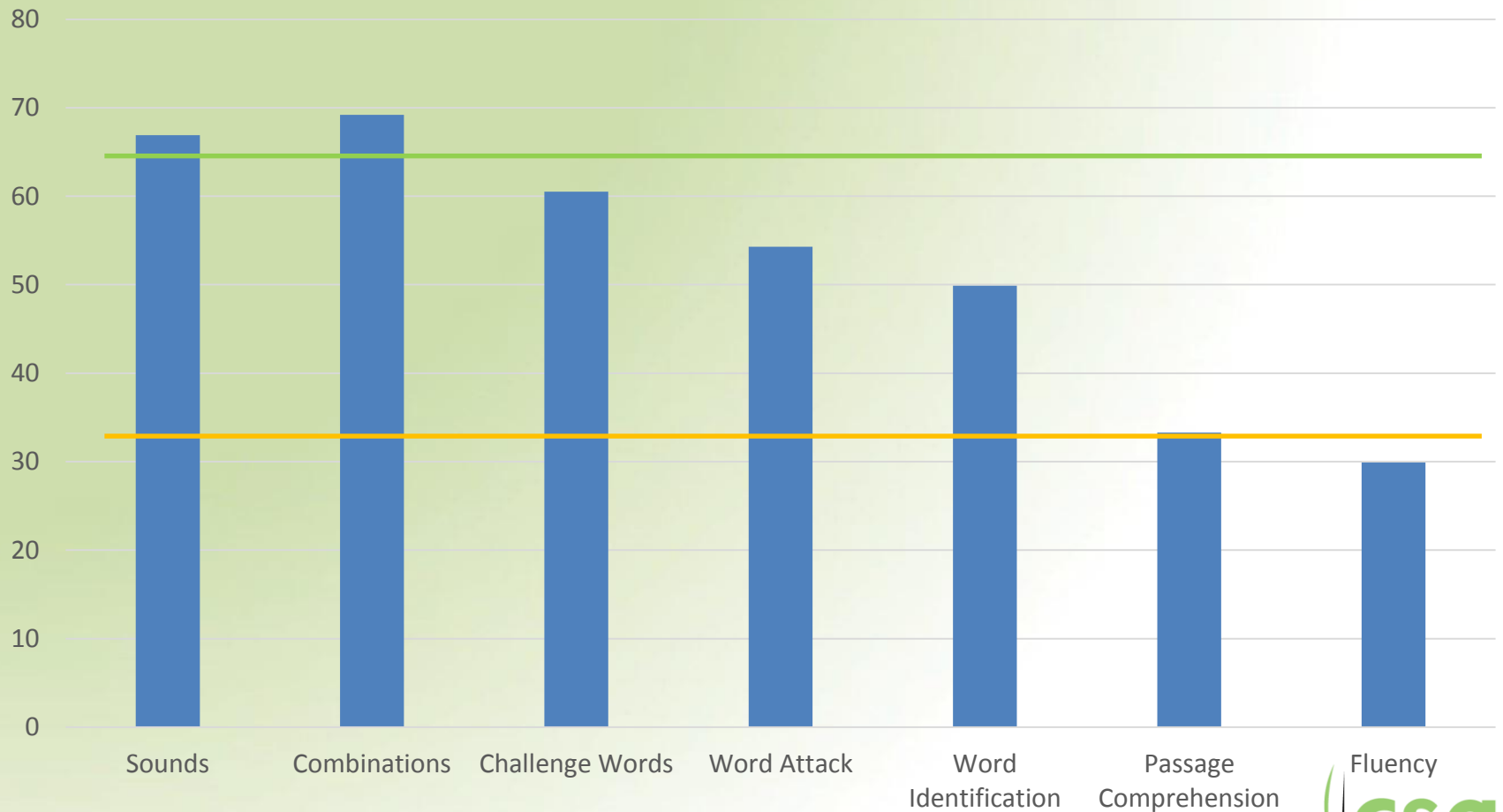
# Standardized Pre-Post Gains on Motivation Constructs

# Standardized Pre-Post Gains on Reading Value

# Challenges/Surprises

- ❑ Challenges:
    - ❑ Technology capabilities at the adult literacy centers
    - ❑ Firewall issues
- ❑ Surprises:
    - ❑ More time than expected needed on PHAST lessons
    - ❑ Greater review needed on PACES lessons
    - ❑ Enthusiasm for course content and focus greater than expected

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# Feasibility Anecdotes

- "I love that we are learning the correct sounds of all the letters."

- "At the hospital, I was able to use my strategies to know how to find my way around."

- "I now know, how to know what to think about when reading something."

- "I love how the teacher on the computer talks to me about my answers."

- "Poor Jordan, he gets so many answers wrong-he needs to listen to what I say more often."

# Our Website
# http://csal.gsu.edu/

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