

# **Maximizing Learning for Special Needs Students within the Instructional Software**

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# Learning to Read

**Reading is not a natural ability.**

Speaking is a normal, genetically-hardwired capability; reading is not!

No areas of the brain are specialized for reading. In fact, reading is probably the most difficult task we ask the young brain to undertake.

# Learning to Read

Perhaps 50 percent of all students make the transition from spoken language to reading with relative ease.

However, for the other 50 percent, reading is a much more formidable task. For about 20 to 30 percent, it becomes the most difficult cognitive task they will every undertake.

# What We Know

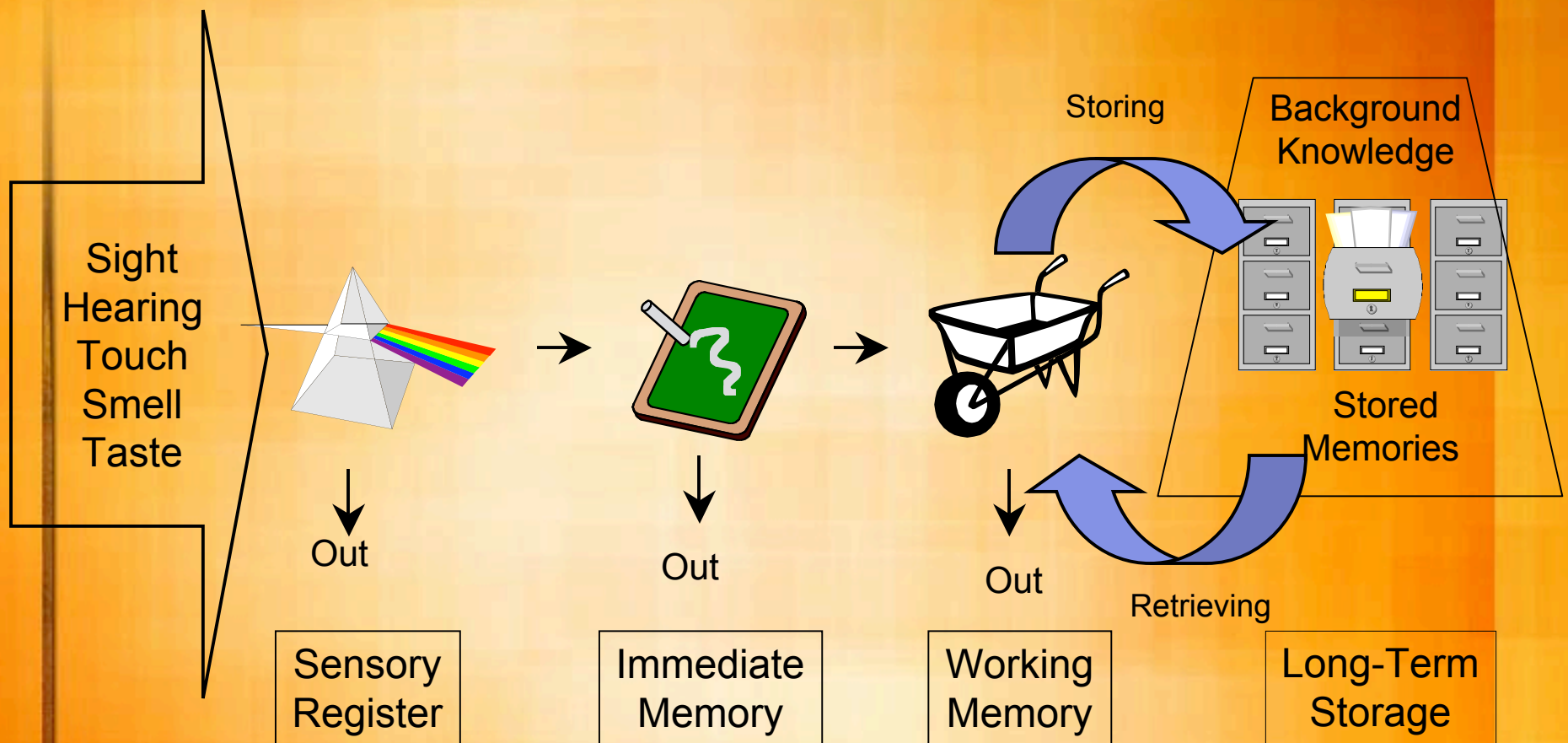
The reading process involves two separate but highly interrelated areas - word identification and comprehension.

# The Problem

Students who are not reading by third grade often have two significant problems that lead to literacy failure:

- Inability to decode and read connected text fluently (build neural models)
- Inability to comprehend text (create mental models)

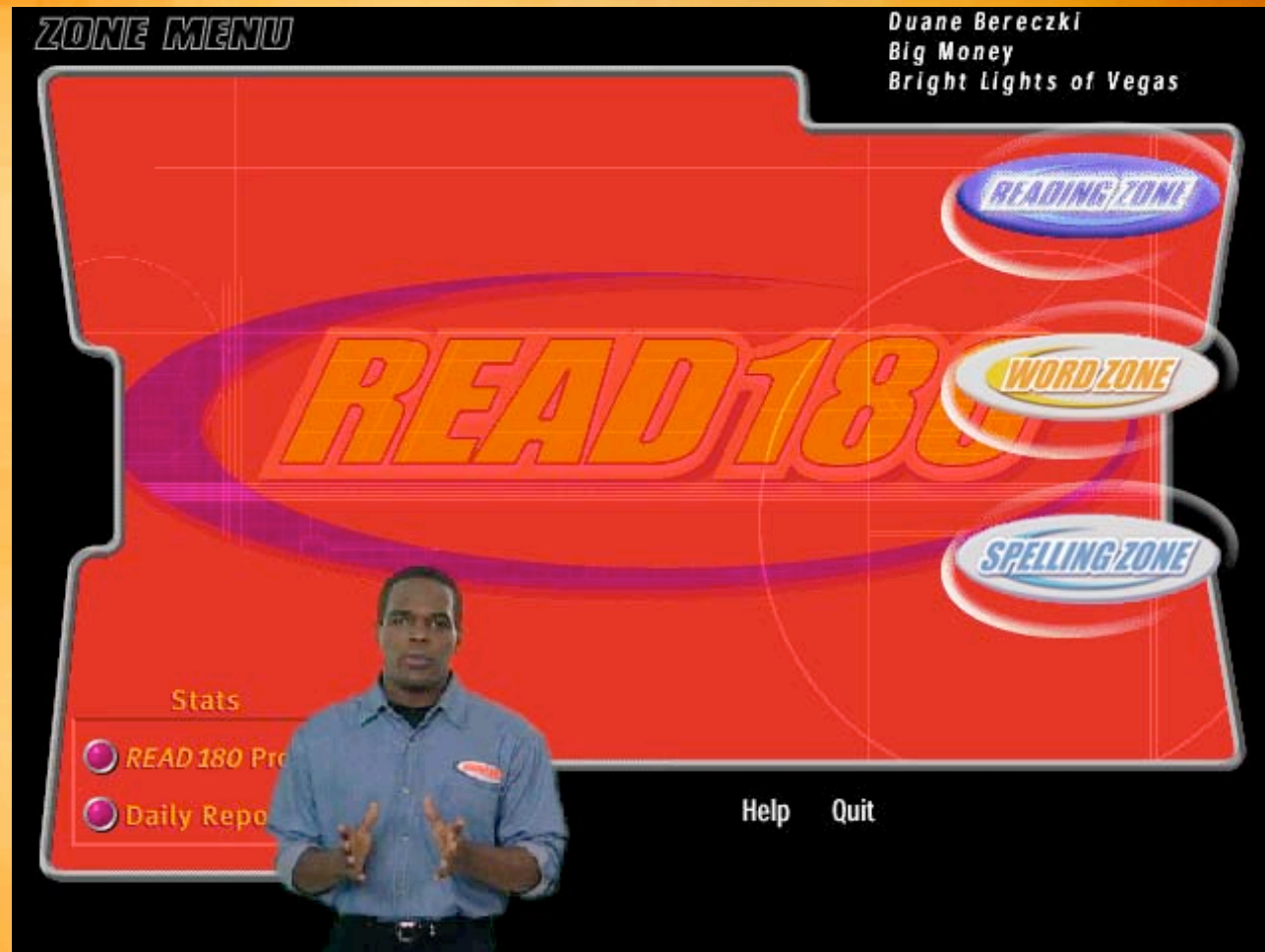
# Information Processing Model



# The READ 180 Software



# Zone Menu





***READING ZONE***

# Video

**VIDEO**



*Snake Stalker*

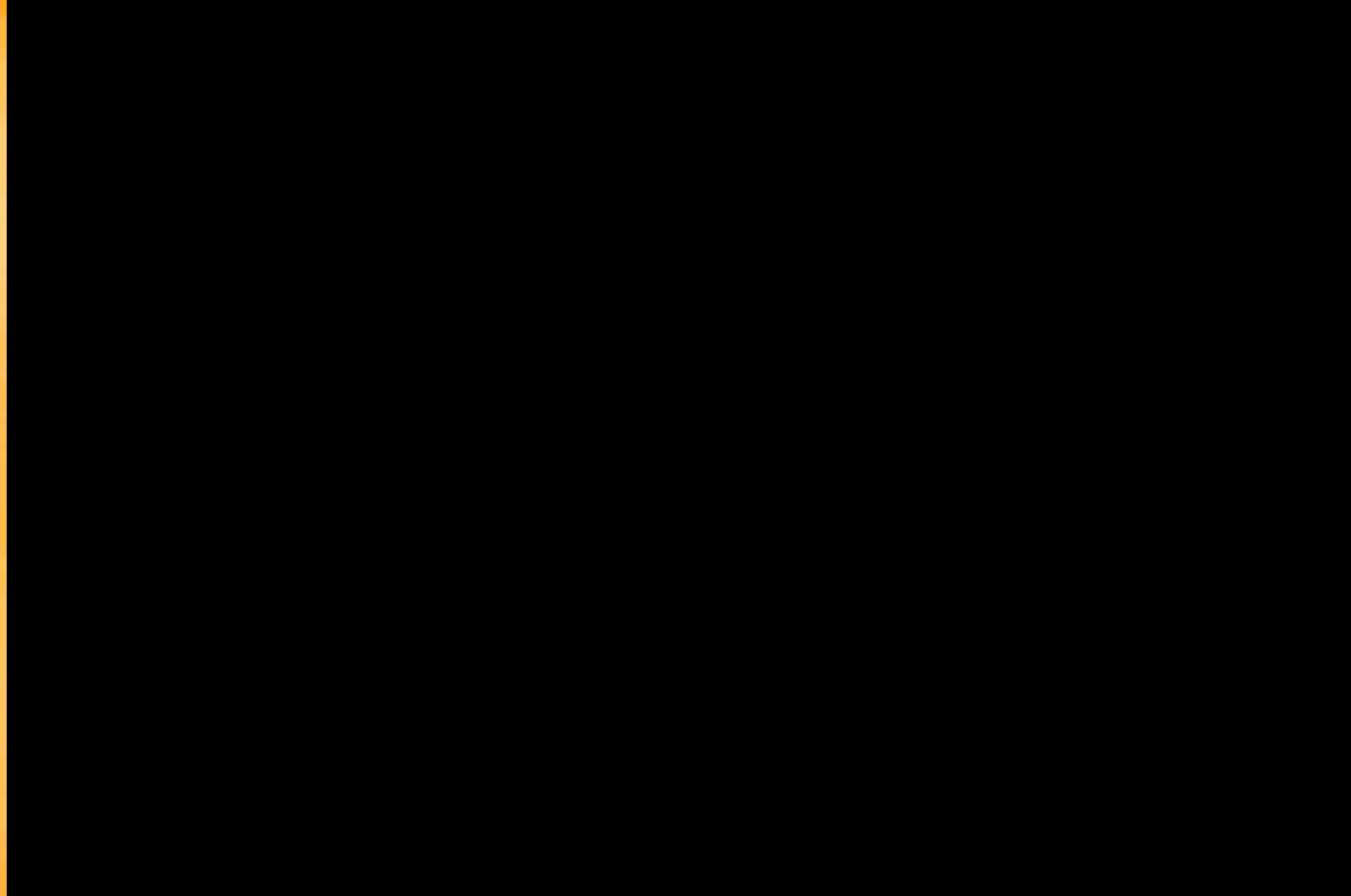
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**Go On**

Help      Zone Menu

The image shows a video player interface within a blue, stylized frame. The frame has a grid pattern on the left side and a 'READING ZONE' logo in the center. The video player window displays a snake in a natural setting with green leaves. Below the video player are navigation controls, including a 'Go On' button and 'Help' and 'Zone Menu' links.

# Snake Stalker



# **Why Video?**

# Comprehension

Reading comprehension is very closely related to language comprehension.

. . . And language comprehension is tied to background knowledge.

# Background Knowledge



# Mental Models

READ 180 is grounded in a “mental model” theory of comprehension. That is, while reading, the student maintains and updates a remarkably complex working mental model of the text. When successful, readers are able to retrieve previously learned information or background knowledge to accurately update the model.

# **Mental Models**

If mental models cannot be constructed from text and language, it is extremely difficult to develop knowledge and understanding (comprehension).

# **Mental Model Theory**

A Red Eared Slider rested on a floating log, and a fish swam beneath him.

# Mental Model???



# Mental Model Theory

A turtle rested on a floating log, and a fish swam beneath it.

A mental model consists of mental tokens arranged in a structure that depicts the situation described by a text.

(McNamara, Miller & Bransford, 1991)

# **Anchored Instruction**

Thus, the READ 180 approach to supplementing background knowledge is to use video to help create accurate mental models and to build understanding.

CTGV, 1994

# **The Power of Anchors**

Anchors provide the learner with the necessary background knowledge to build new knowledge and deepen understanding and a context for making sense out of new skills and knowledge.

# Leveled Passages

The screenshot shows a software window titled "PASSAGE" with a dark background and blue accents. At the top, there are navigation icons: a person, a play button, and a stop button, followed by three buttons labeled "Word", "Phrase", and "Practice". The main content area contains two paragraphs of text. A green callout box is overlaid on the bottom right of the text, providing details about the passage level. Below the text, there are several buttons: "Record" on the left, "Video" in the center, "Help" at the bottom center, and "Zone Menu" at the bottom right. A blue play button icon is also visible on the right side of the text area.

**PASSAGE**

Word Phrase Practice

Everyone should stay focused at work, but if Jesus Rivas gets distracted for even a moment, he could be strangled by a 500-pound snake. Rivas, a biologist, is leading the first-ever study of anacondas in the wild.

Rivas braves flesh-eating piranhas and killer caimans to stalk massive anacondas in the swamps of Venezuela, always working barefoot so he can feel what's slithering beneath him. Rivas and his wife, Renee Owens, have caught, cataloged, and released

**Level 4 Passage**  
Lexile Level 800–1100  
Grade Level 5.0–8.0

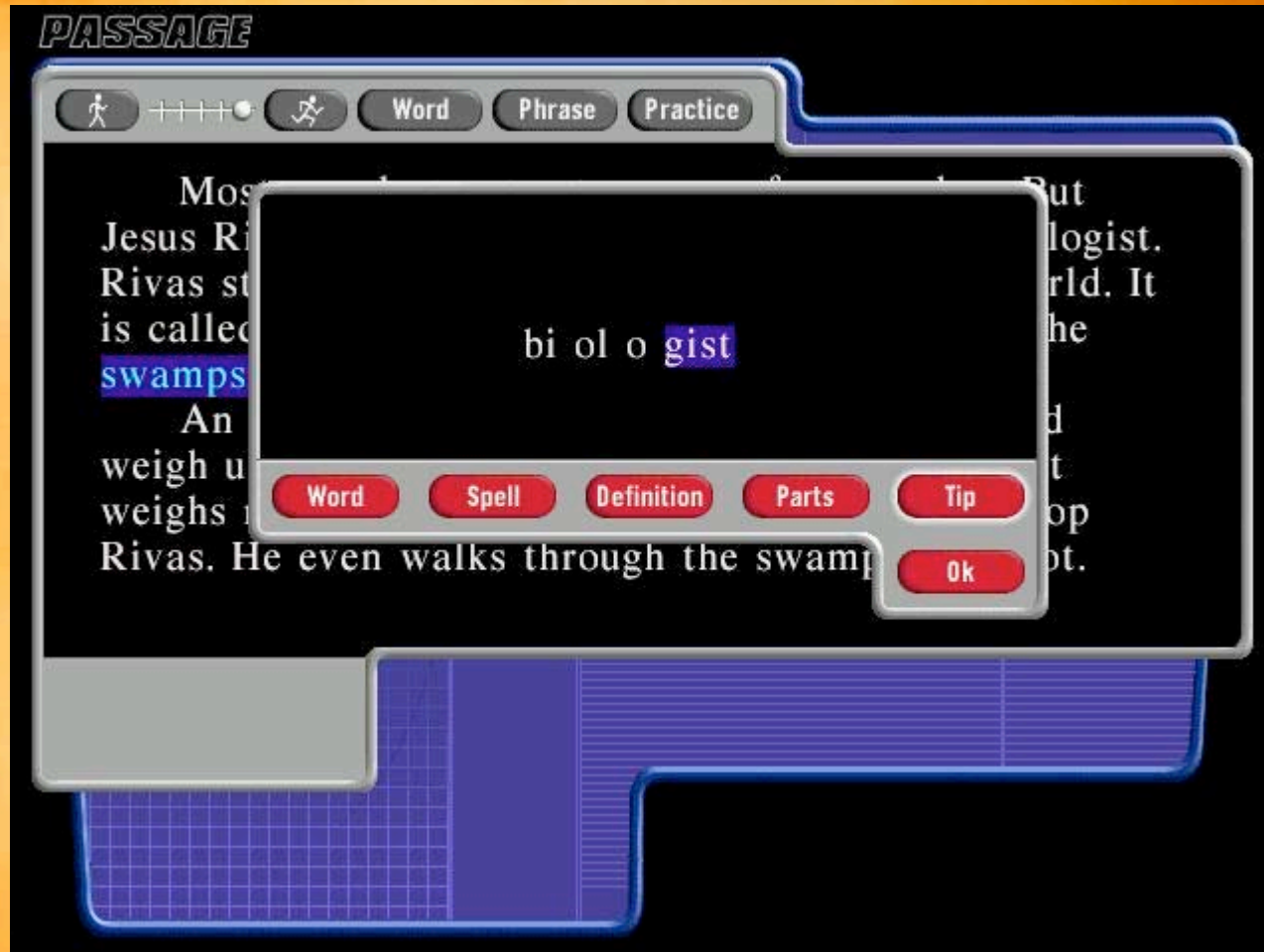
Record Video Help Zone Menu

# Why Leveled Passages?

- Match student's instructional level
- Reduce cognitive load
- Build fluency
- Increase comprehension

Ideally, students should read and re-read the leveled passages each day.

# Dictionary



# Quick Check

**QUICK CHECK**

Anacondas are found in

- deserts in Venezuela.
- deserts in Rivas.
- swamps in Venezuela.
- swamps in the United States.

Passage      Go On

Help      Zone Menu

# Why Quick Check?

- Helps students understand that reading should have meaning.
- Gives us a snapshot of student's ability to draw meaning from the text.

Encourage students to take this seriously, otherwise their progress will be slowed.

**WORDZONE**

# Skillful Readers

The most salient characteristic of skillful readers is the speed and effortlessness with which they consume text.

Skillful readers can recognize the spelling, sound, and meaning of a familiar word almost instantly and automatically, leaving their working memory free for comprehension and reflective thought.

# Skillful Readers

It is because of their deep knowledge of orthography that skillful readers look and feel as though they recognize words holistically.

Although the individual letters of text are the basic perceptual data of reading, they are not perceived one by one, independently of each other.

# Skillful Readers

*In reading, students first learn the alphabetic principle and use this to decode words, often very laboriously. Through repeated trials, the student will develop a “neural model” of the word and no longer relies on the use of the alphabetic principle. The more times the student reads the word correctly the stronger the neural pathway becomes and fluency increases.*

Shaywitz (2003)

# Word Recognition

Although the ultimate goal of instruction on word recognition is to develop direct pathways from *print to meaning*, the growth of young readers' visual vocabularies depends integrally on knowledge of spelling-sound relations (alphabetic principle).

# The Problem

Today, there are large numbers of students who struggle with reading because they have not developed the alphabetic principle and neural models. As a result they are unable to decode and read connected text fluently.

# First Decision

Does student have the “Alphabetic Principle?”

yes

no



# **Fluency and Automaticity**

# What is Fluency?

Fluency is the building block of expertise in all things that we do well.

# **Automaticity vs. Fluency**

Automaticity is defined as fast, accurate and effortless word identification at the single word level. The speed and accuracy at which single words are identified is the best predictor of comprehension.

# **Automaticity vs. Fluency**

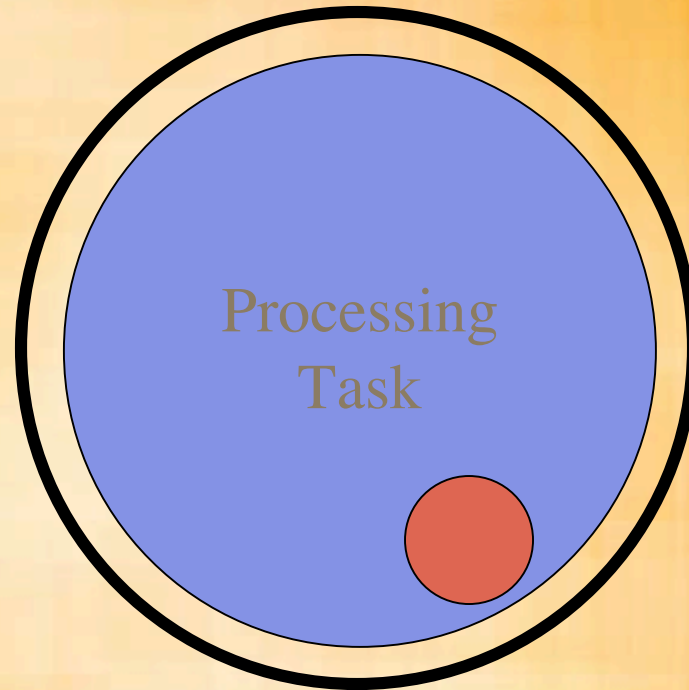
Fluency, on the other hand, involves not only automatic word identification but also the application of appropriate prosodic features (rhythm, intonation, and phrasing) at the phrase, sentence, and text levels.

# Importance of Automaticity

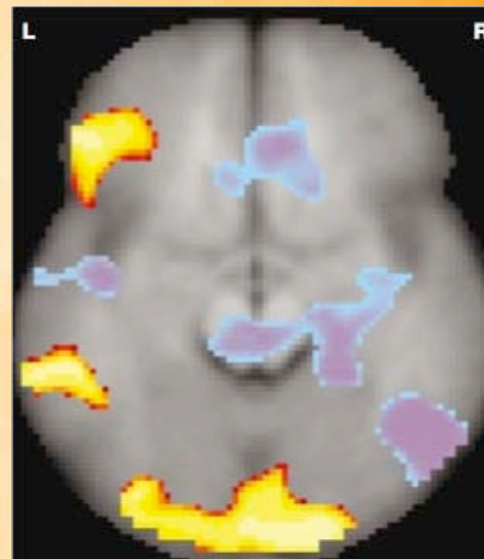
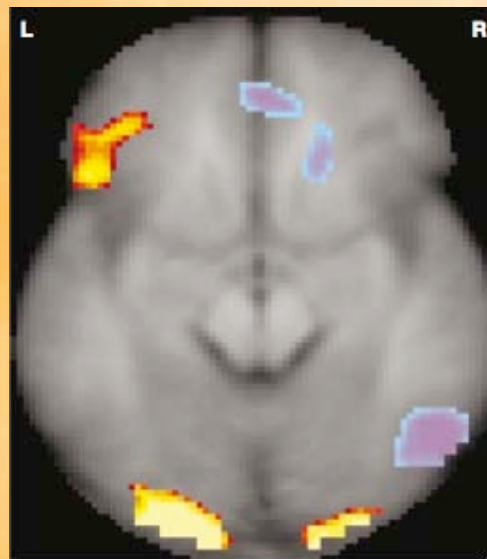
*. . . the automaticity with which skillful readers recognize words is the key to the whole system. The reader's attention can be focused on the meaning and message of a text only to the extent that it's free from fussing with the words and letters*

Marilyn Adams

# Human Processing



# fMRI



# Importance of Fluency

Fluency frees up attention for higher order applications rather than overloading attention with the mechanics of performance.

# **How is Fluency Developed?**

# Fluency Development

Fluency requires the retrieval of information stored in long-term memory, such as sight words, math facts, or spelling words.

# Working Memory

The human's limited working memory has caused many students to fail to develop high levels of fluency during instruction in basic skills, such as decoding, sight words, spelling and math facts.

# Storing Information

Because of the limitations of working memory we must help students move information from working memory to long-term memory.

# The Advantage of Technology

Technology allows us to provide “instruction and rehearsal time” well beyond what a teacher can provide.

However, to realize these advantages we have discovered that we must move beyond simple drill and practice.

# FASTT Model \*

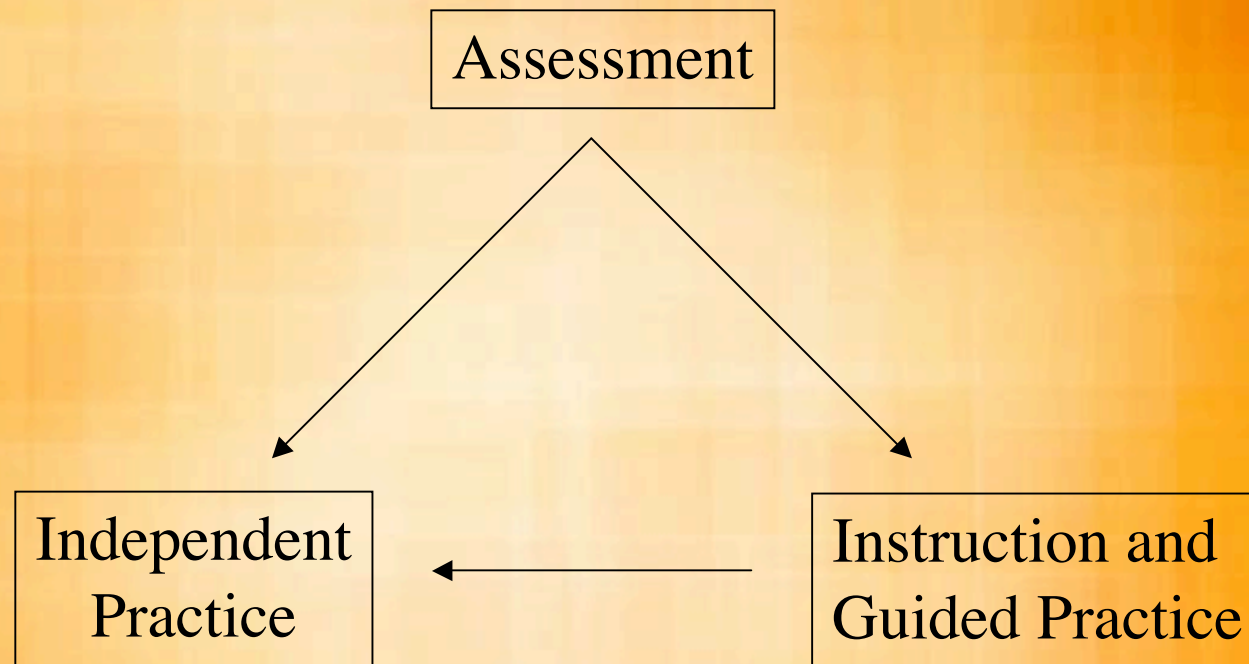
- Assessment
- Small Instruction Set
- Controlled Response Time
- Corrective Feedback
- Expanding recall
- Independent practice on only learned information

\* Fluency and Automaticity through  
Systematic Teaching with Technology

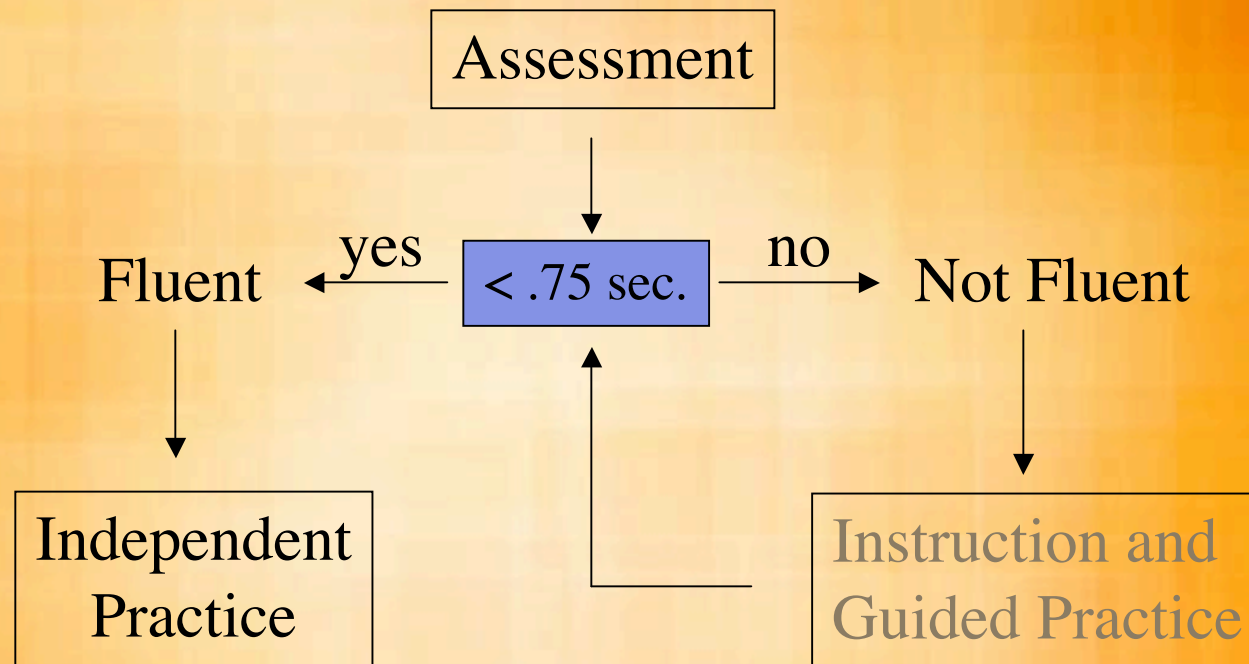
# **FASTT Model**

The FASTT Model is based on the accurate measurement of a student's speed and accuracy in responding.

# FASTT Model Components



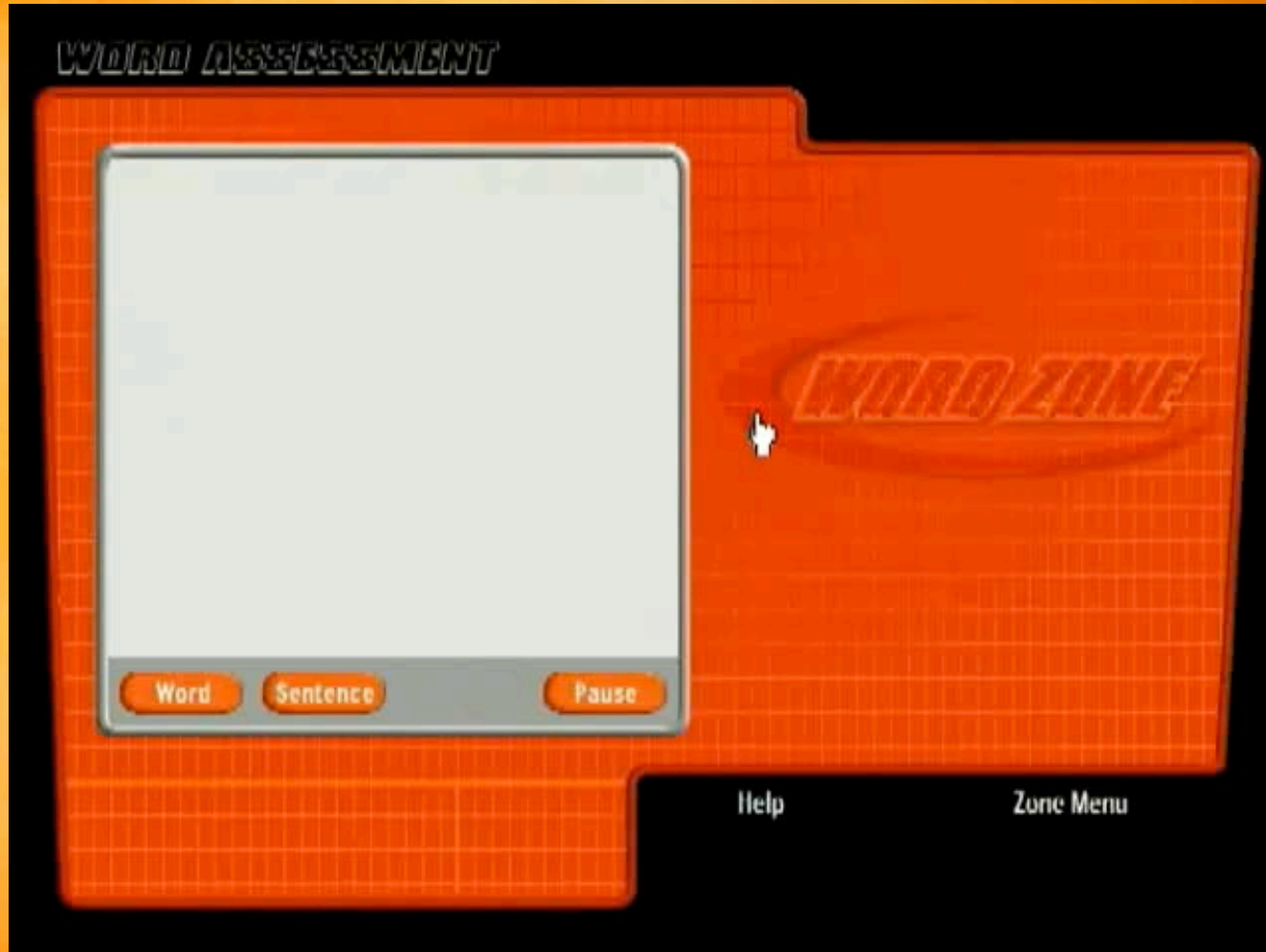
# Instructional Component



# Word Assessment



# Word Assessment



# Correct/Slow/Missed

**WORD ASSESSMENT**

Correct	Slow	Missed
boots walks feet all but	walk be	snakes meal might

Go On

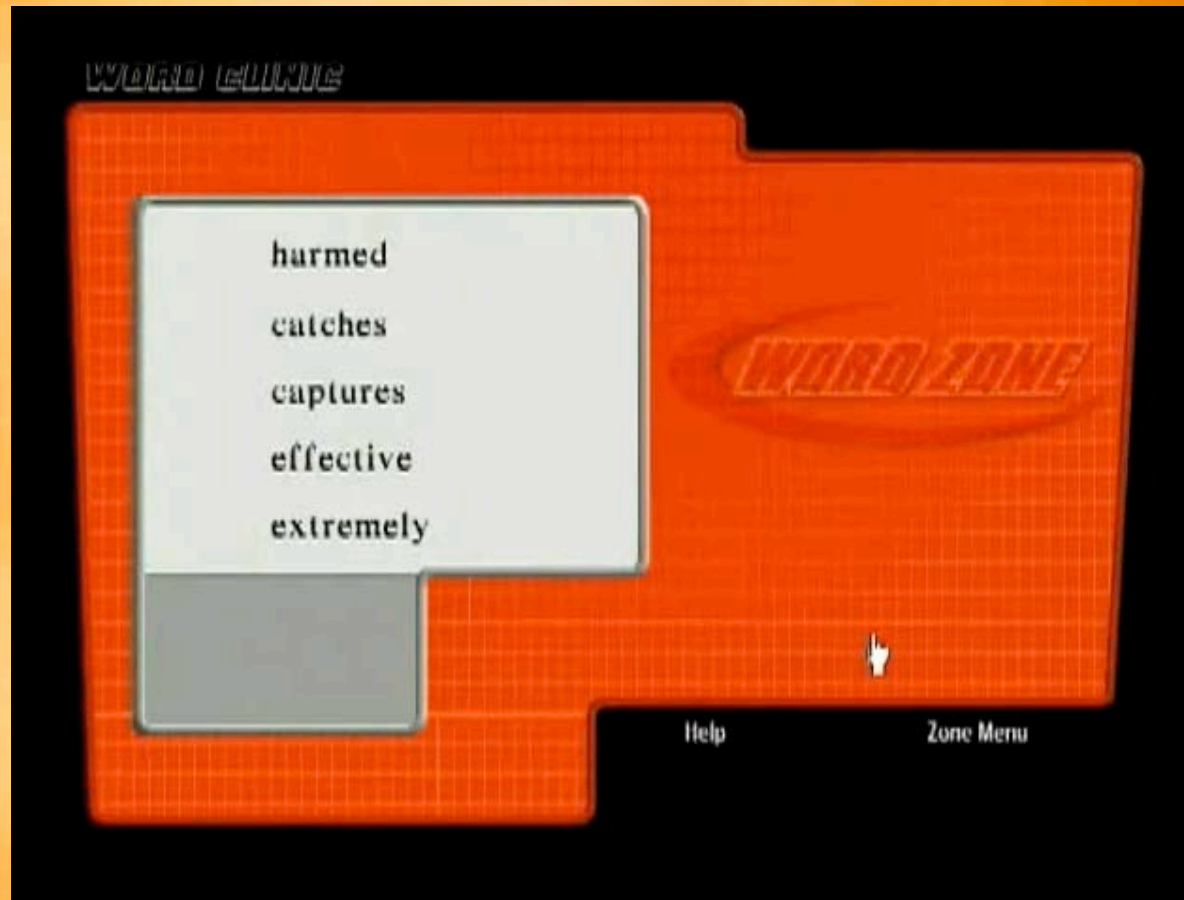
Help      Zone Menu

# Instructional Component

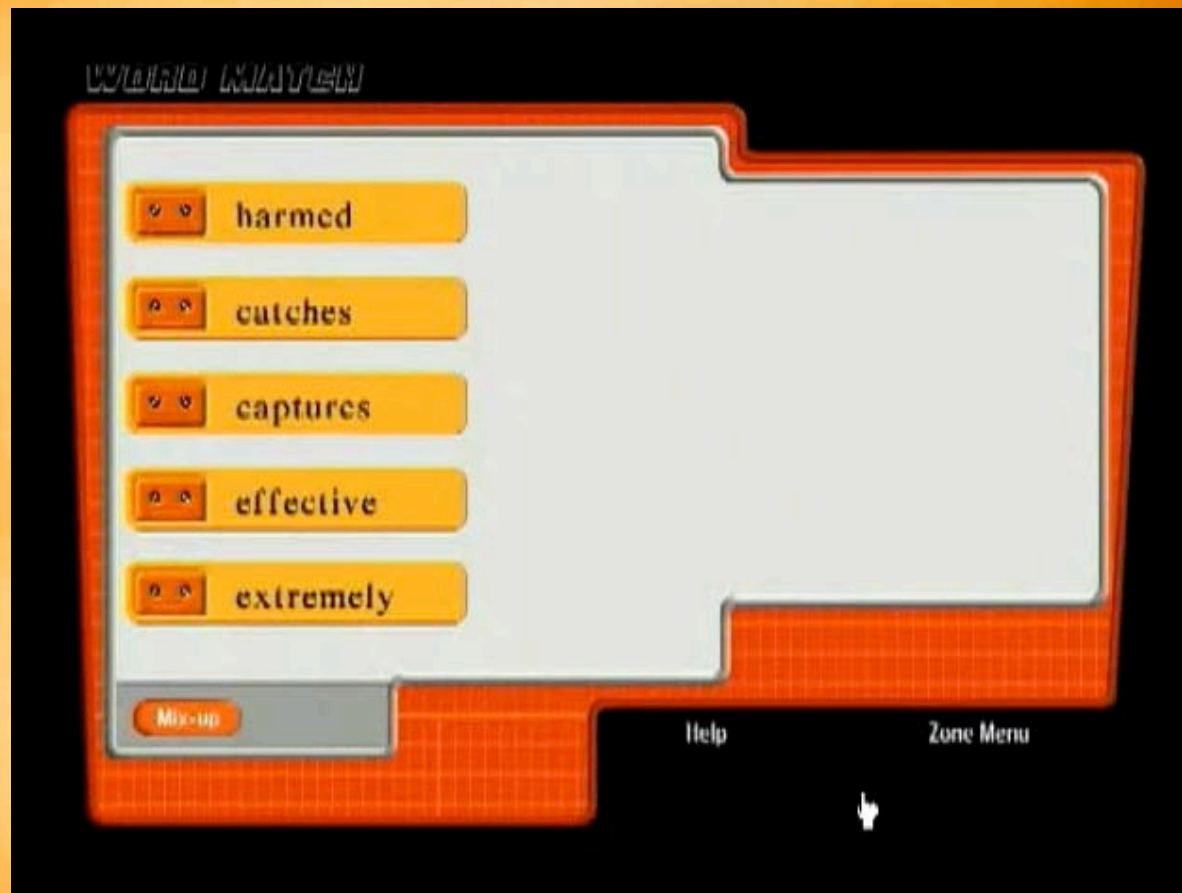
## Instruction and Guided practice

- Small instruction set
- Controlled response time
- Corrective feedback
- Expanding recall

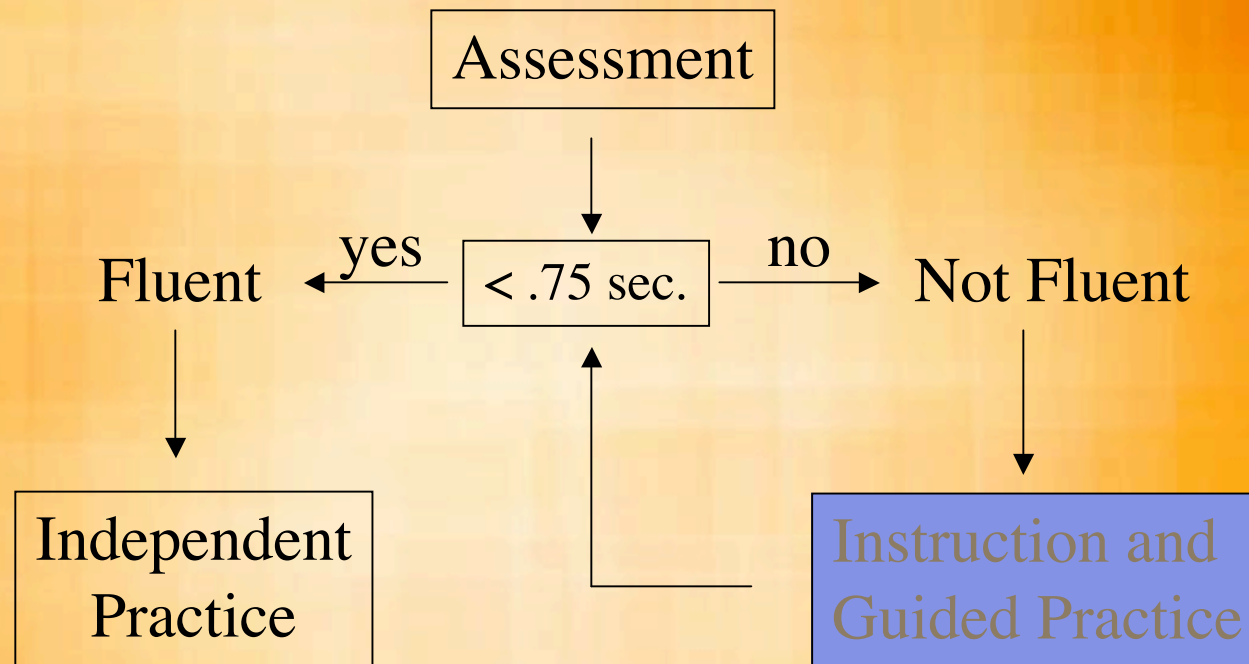
# Word Clinic



# Word Match



# Instructional Component



# Rehearsal

We must ensure that students rehearse new information correctly from the beginning.

Thus, early rehearsal is best done so that any errors can be immediately corrective corrected.

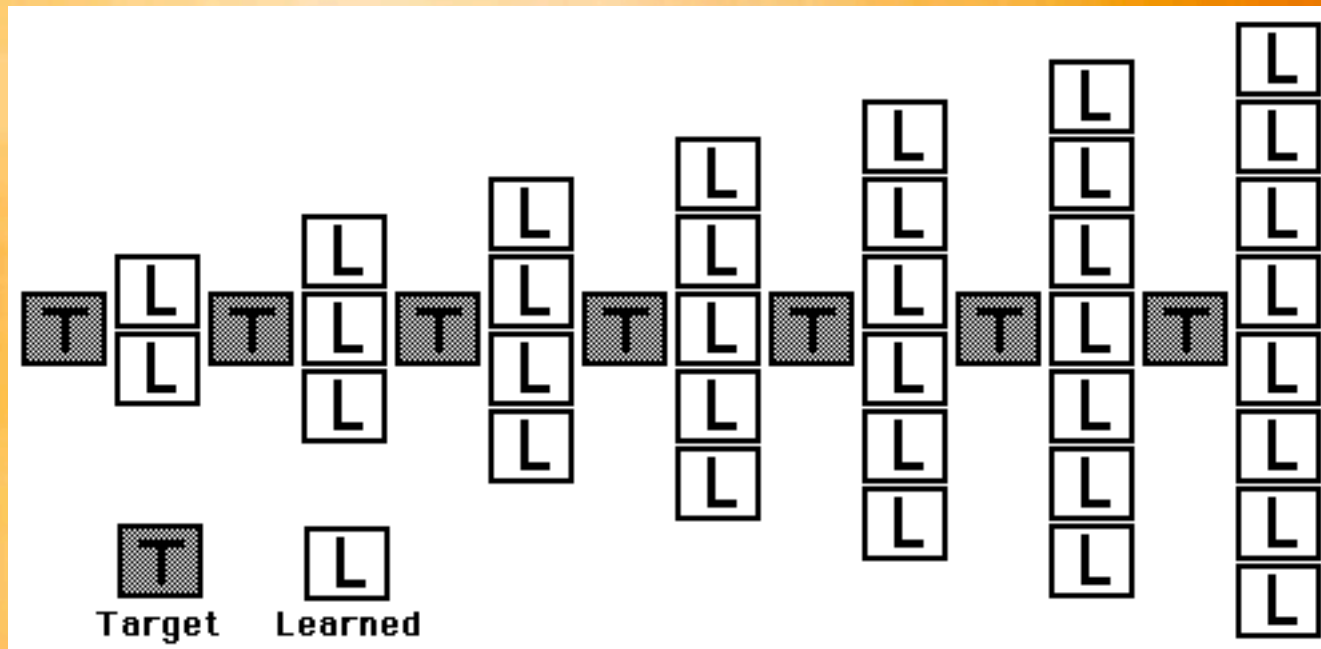
# **Distributed vs Massed Rehearsal**

It is well documented that distributing the rehearsal of information increases the likelihood that it will move to long-term storage.

# Distributed Practice



# Expanding Recall



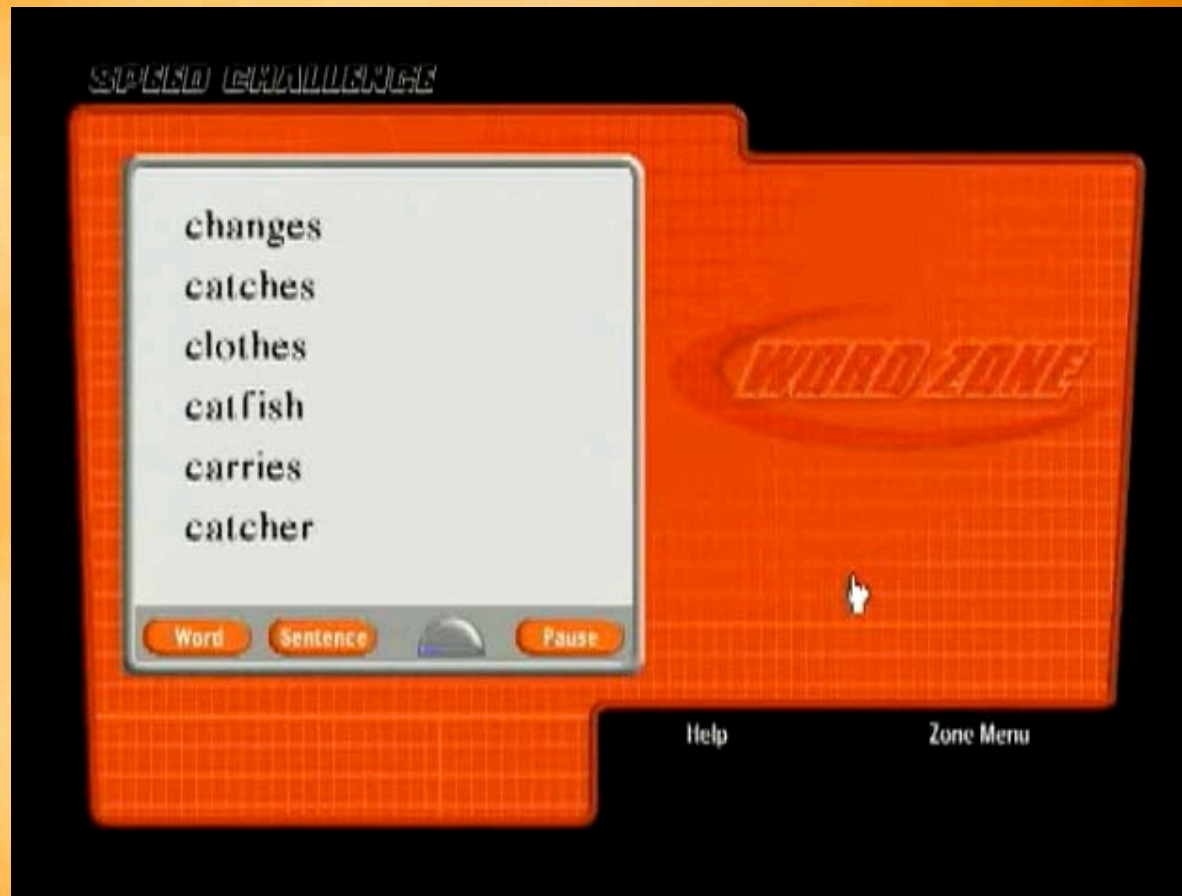
# Independent Practice

When student rehearsal is accurate and correct, then and only then, *independent practice* (drill and practice) can be used so students can practice the skill to enhance retention.

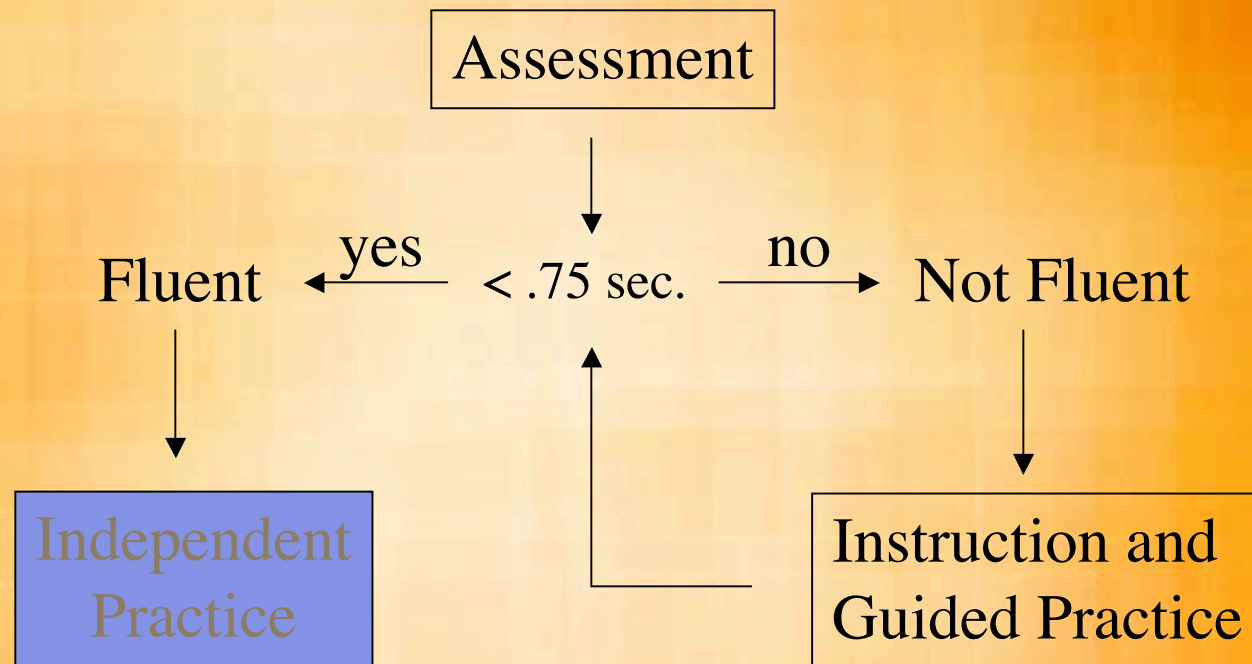
# Teaching Implications

- Avoid giving students independent practice before guided practice.
- Rehearsal makes *permanent* not perfect.
- If a learner practices a skill incorrectly, but well, unlearning and relearning that skill correctly is very difficult.

# Speed Challenge



# Independent Practice



# Independent Practice

Practice only stored information

- Provide multiple opportunities to respond
- Variable time constraint
- Feedback on progress




***SPELLING ZONE***

# Spelling

*SPELLING CLINIC*

feet



Word Sentence Tip Parts Spell

Help Zone Menu

The image shows a software interface for a spelling program. At the top left, the text "SPELLING CLINIC" is displayed in a stylized, italicized font. The main area is a light blue rounded rectangle with a grid pattern. In the center, the word "feet" is written in a simple font. Below the word is a small pencil icon and a light blue rectangular input field. At the bottom of this central area, there are five blue buttons with white text: "Word", "Sentence", "Tip", "Parts", and "Spell". To the right of the main area, there is a faint "ZONE" logo. At the bottom right of the interface, the words "Help" and "Zone Menu" are visible.

# Spelling



# Working Memory

Students must hold the three words in working memory long enough to type the correct sequence of letters before they begin rehearsing the words using “expanding recall.”

# Modeling Only

The student spells the word:

Amereca

Feedback:

No, the correct spelling is:

America

# Imitation + Modeling

The student spells the word:

Amereca

Feedback:

No, you spelled the word:

Amereca

The correct spelling is:

America

# Correct Letter Sequence

Imagine you have two students who spell the word “America” as follows:

- Student 1 – Amrka
- Student 2 – Amereca

- Correct:         $\_ \wedge A \wedge m \wedge e \wedge r \wedge i \wedge c \wedge a \wedge \_$                     CLS = 8
- Student 1:      $\_ \wedge A \wedge m \wedge r \wedge k \wedge a \wedge \_$                     CLS = 3
- Student2:       $\_ \wedge A \wedge m \wedge e \wedge r \wedge e \wedge c \wedge a \wedge \_$                     CLS = 6



***SUCCESS ZONE***

# Discrepancy Passages

**DISCREPANCY PASSAGES**

Passage 1   Passage 2   **Passage 3**

Unlike most people, Jesus Rivas likes to get up close and personal with snakes. Rivas is a veterinarian. He wants to learn all about one of the biggest snakes in the world, called the anaconda.

The anaconda is found in the swamps of Venezuela. It can grow to 30-feet long and weigh up to 550 pounds. The anaconda must eat more than 100 times a day to grow to this size.

Which is Right?

- Passage 1
- Passage 2
- Passage 3

Done

Video

Help   Zone Menu

# **Reading Comprehension**

# Reading Comprehension and Working Memory

When reading sentences, the brain must decode and then retain the words at the beginning of a sentence for a period of time while the reader's eyes move to the end of the sentence.

Because of working memory's limited capacity, beginning readers will have difficulty understanding long sentences.

# Forming Gists

For even good readers, because working memory has limited capacity, it cannot hold all the words of a long sentence.

To deal with this limitation, working memory merges words within a clause to form a *gist* (chunk) that is held in place of the words.

# Gists

As reading continues, new gists are of clauses are added a gist for the sentence is completed. Gists from sentences makeup gists of paragraphs, then chapters, and so on.

# Gists and Mental Models

A reader's ability to comprehend gists is largely dependent on that individual's past experiences (background knowledge) and the mental models that have evolved as a result of those experiences.

# Mental Models

For a variety of reasons, many students have difficulty constructing mental models from text.

Often it's because they don't have the necessary background knowledge to construct an accurate mental model.

# Background Knowledge

When background knowledge does not exist it is necessary to provide that knowledge as a starting point for deepening understanding.

# Building Mental Models



# Building Mental Models



# Building Mental Models



# Context Passages

**CONTEXT PASSAGES**

Dr. Martin Luther King wanted to end injustice. He \_\_\_\_\_ wanted the Civil Rights Act to pass. This law would \_\_\_\_\_ all Americans the same rights. To \_\_\_\_\_ the law pass, King led a march on Washington. Thanks to thousands of people, the peaceful \_\_\_\_\_ worked! The law was passed in 1964.

overly  
never  
by  
also  
thirdly  
and

Go On

Help      Zone Menu

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