

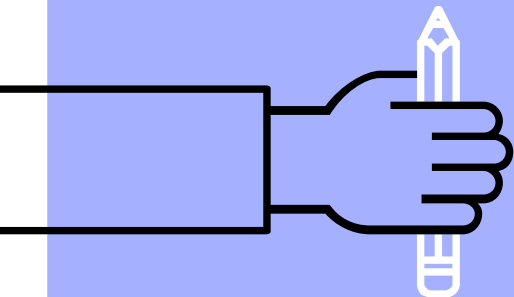
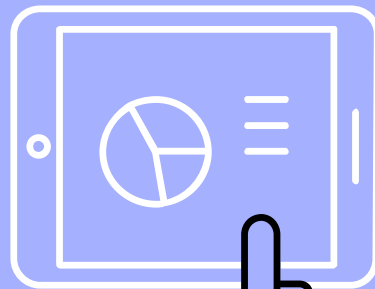
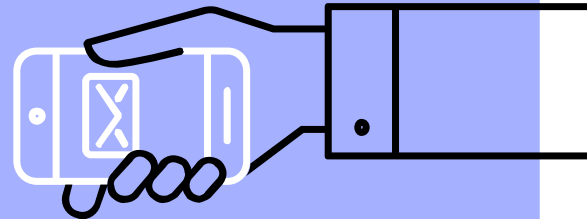


UNIVERSITY OF TORONTO
OISE | ONTARIO INSTITUTE
FOR STUDIES IN EDUCATION

SETTING STUDENTS UP FOR SUCCESS WITH ASSISTIVE TECHNOLOGY

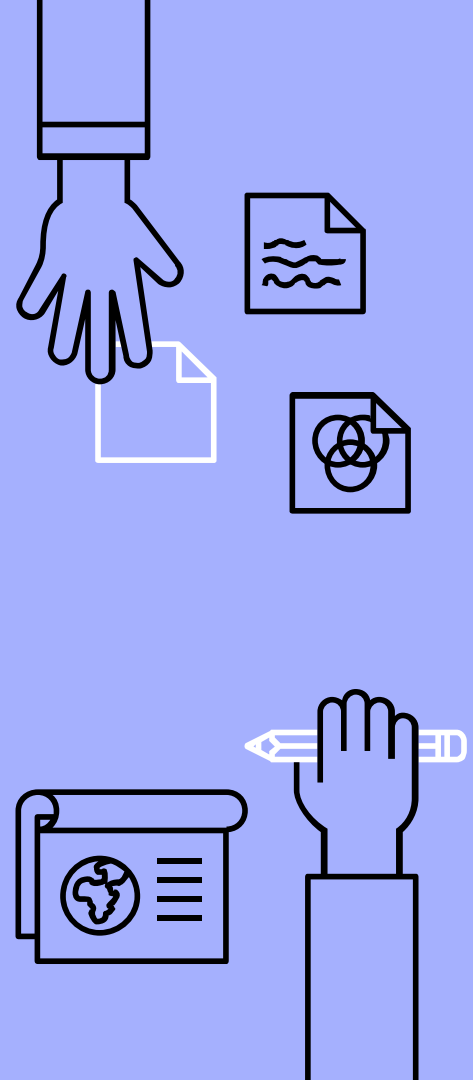
Bronwyn Lamond, Hillary Scott
& Mirelle D'Mello

Get the slides at:
www.AcademicInterventionLab.com

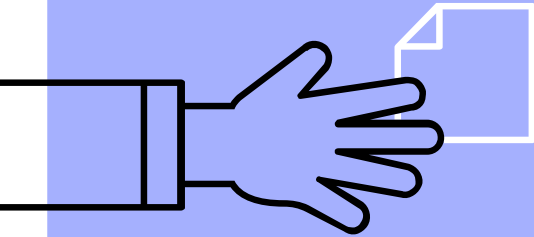
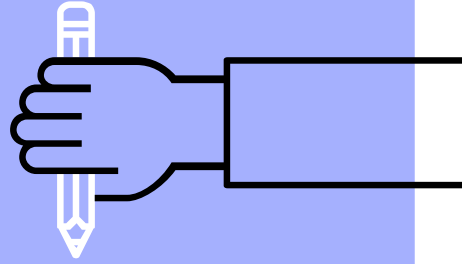


Agenda

1. Overview of AT
2. Common Implementation Problems
3. Challenges and Best Practices:
 - a. Text-to-Speech
 - b. Voice Recognition
 - c. Editing Assistance
4. Demonstrations and Practice Using ATSelect.org



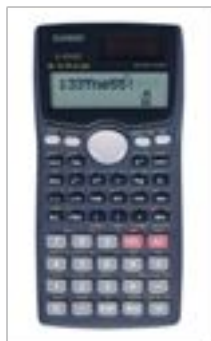
What is AT?



“

*Assistive Technology is
any technology that
allows an individual with
a disability to increase,
maintain, or improve
their functional
capabilities.*

(Edyburn, 2000)



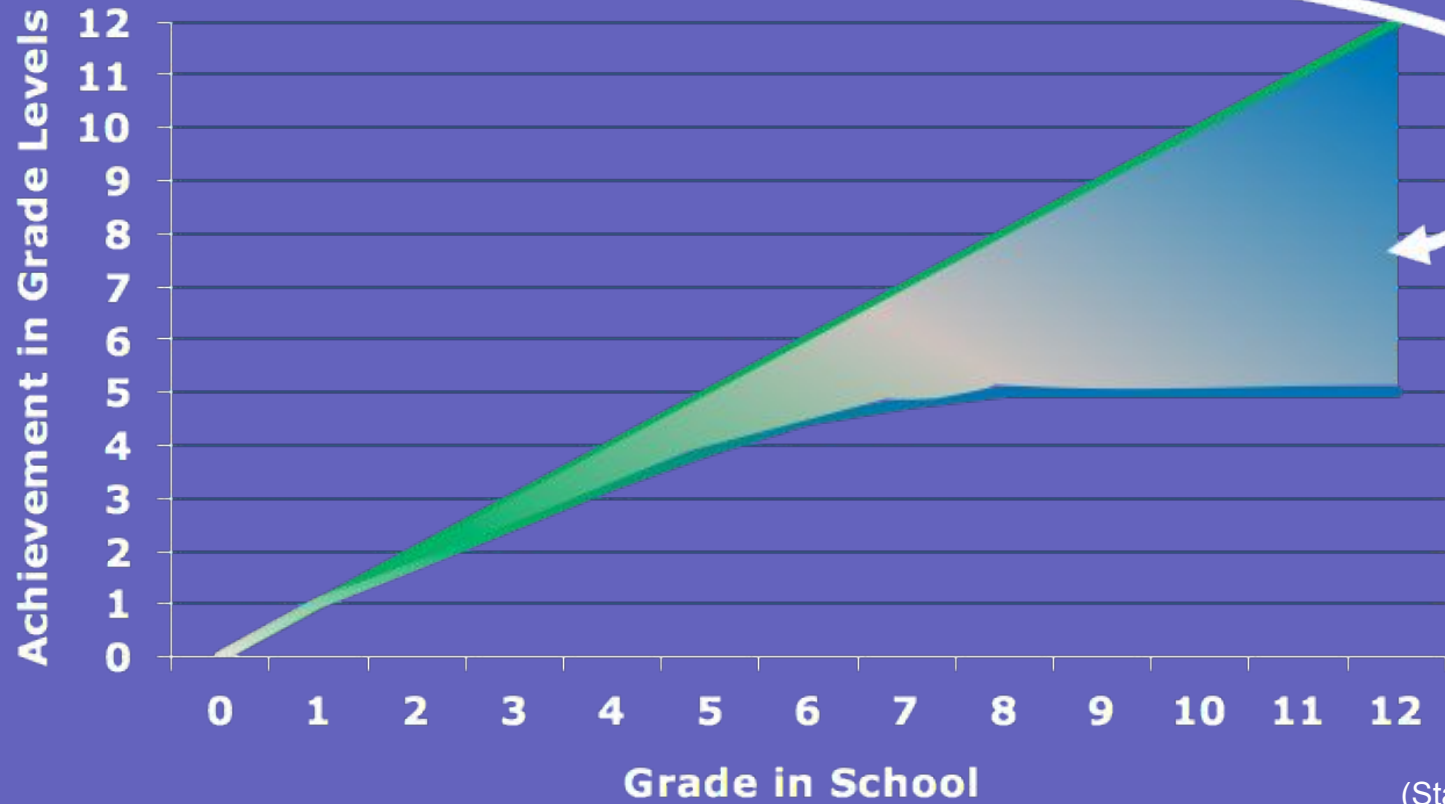
Low Tech



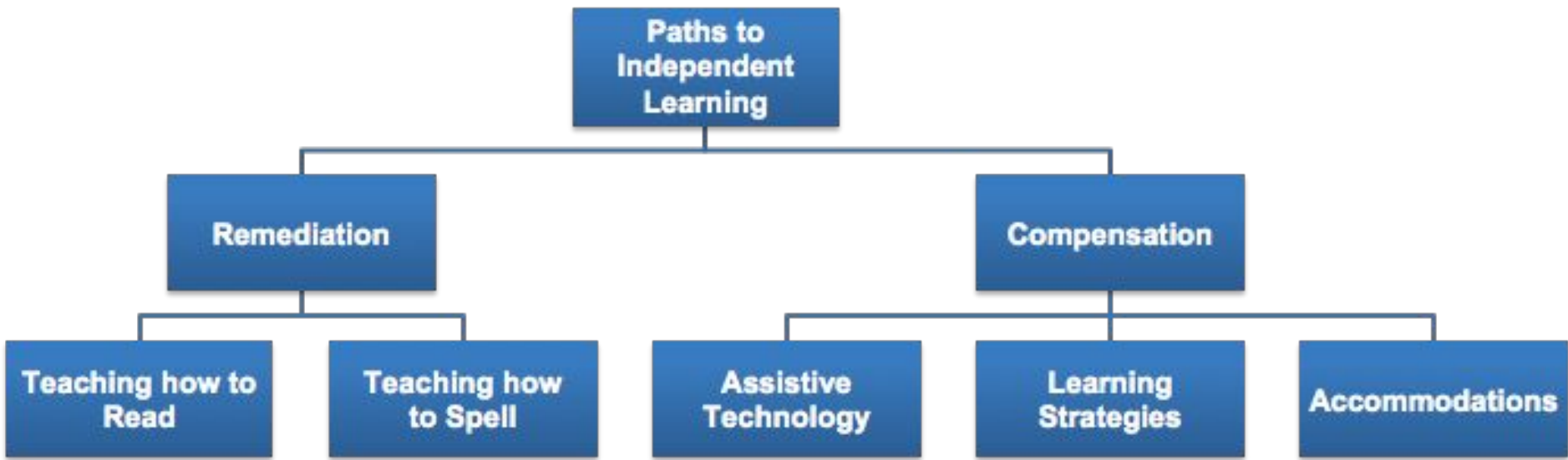
High Tech



PERFORMANCE GAP

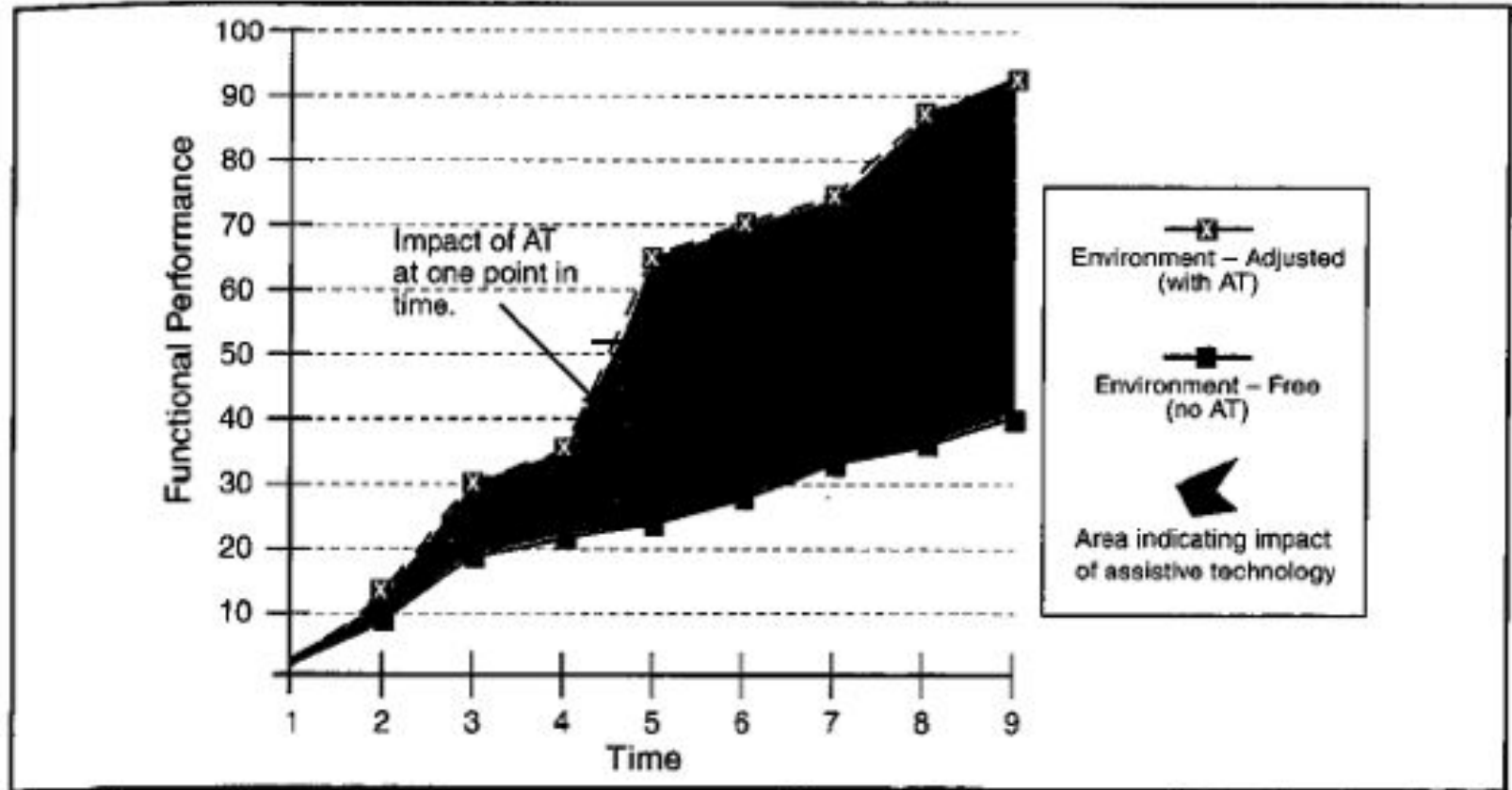


(Stanovich, 1986)





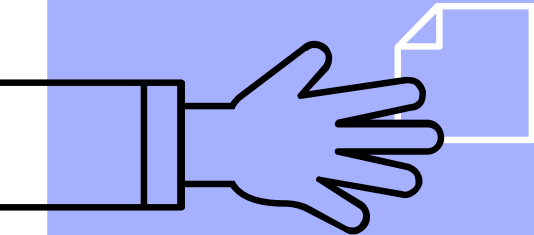
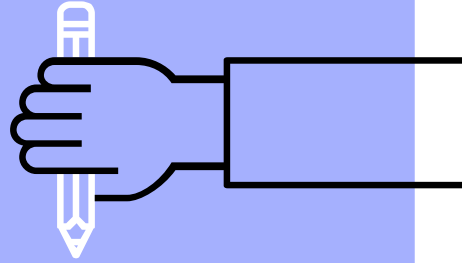
Theoretical view of the role AT can play in an individual's life.

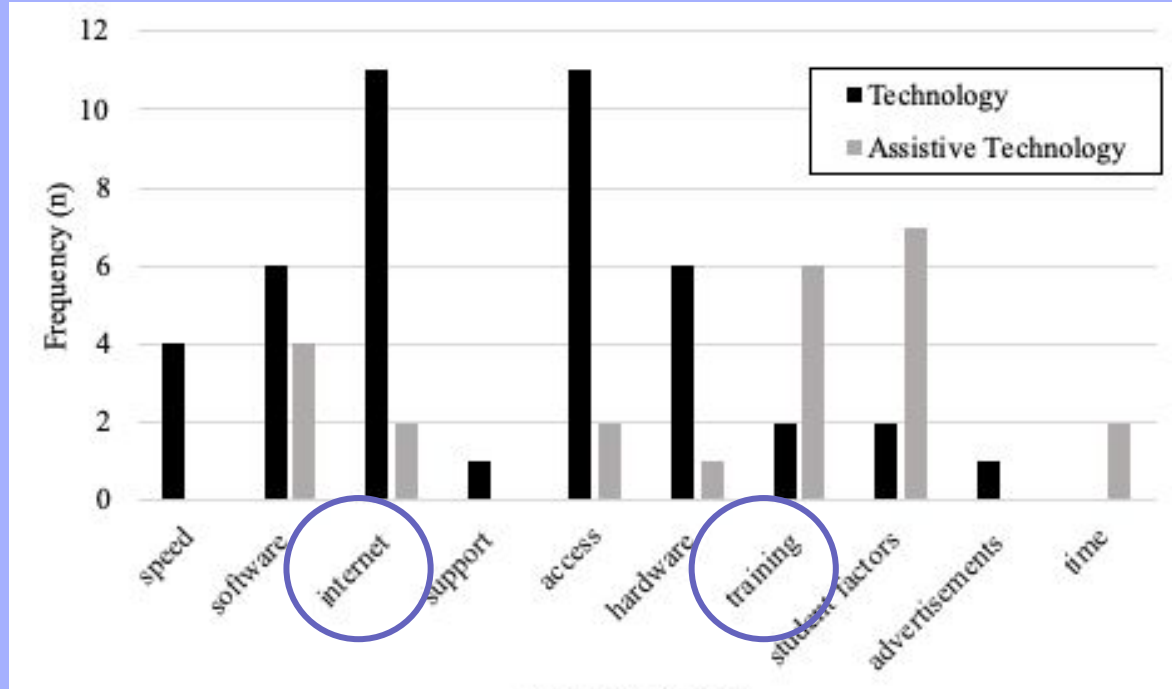






What barriers arise when
you implement AT?





When choosing AT tools for students we need to be thinking about the environment in which they are accessing the AT and consider the internet as a major part of this.



Recommendations:

- Implement a classroom routine that includes preloading of AT programs
- Consider AT products that are not internet reliant

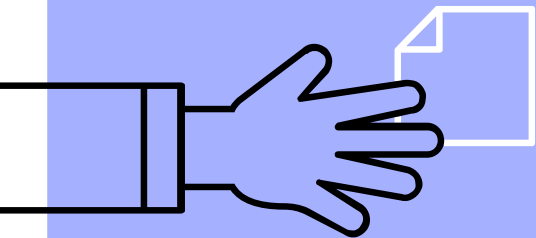
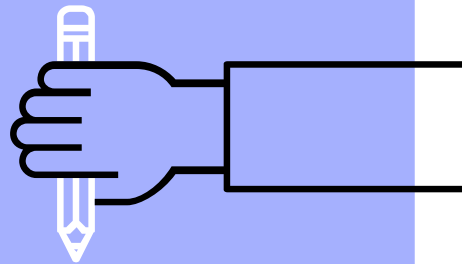
Students generally learn how to use AT tools faster than teachers. Teachers don't need to know how to use the AT but need to create an environment that facilitates the implementation of AT.

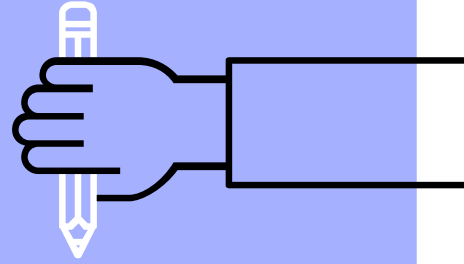


Recommendations:

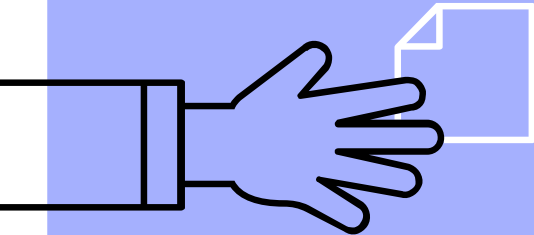
- Students should be trained only on the tools that they require to overcome their skill deficits
- Use the SETT Framework and [ATSelect.org](https://www.atselect.org) to help with the decision-making process

Text-to-Speech



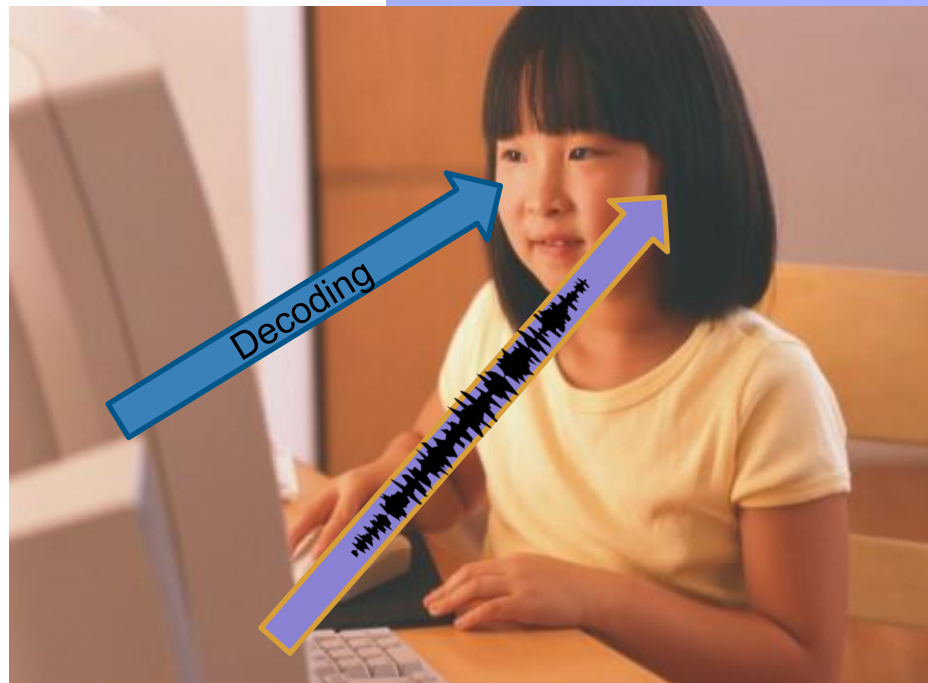


Which TTS programs have you
used?



Text-to-Speech (TTS)

- ▶ Computer software that presents text auditorily
- ▶ Thought to circumvent the need to decode (ATSelect, 2019)



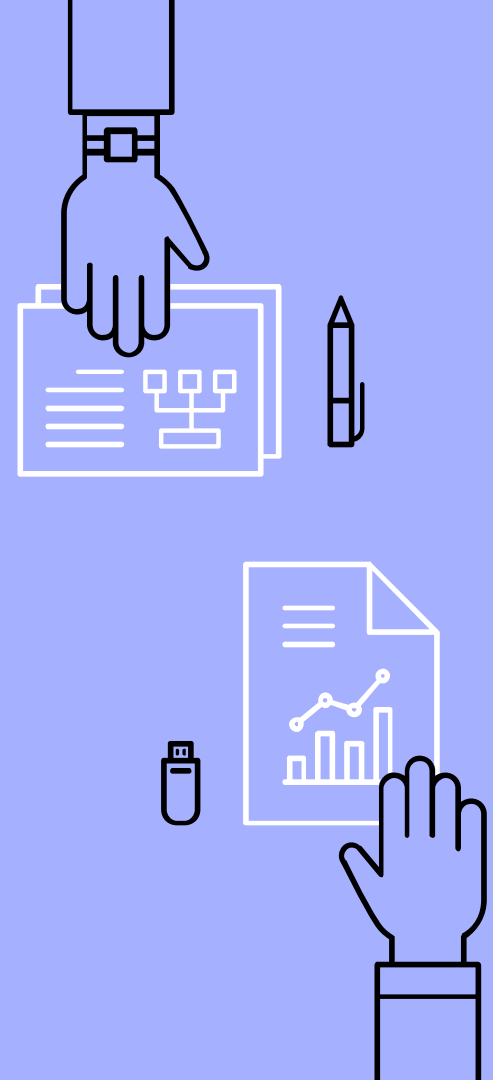
TTS can:

- ▶ Circumvent challenges in reading
(Park, Takahashi, Roberts, Delise & Delise, 2017)
- ▶ Help increase vocabulary for ESL learners
(Huang & Liao, 2015)



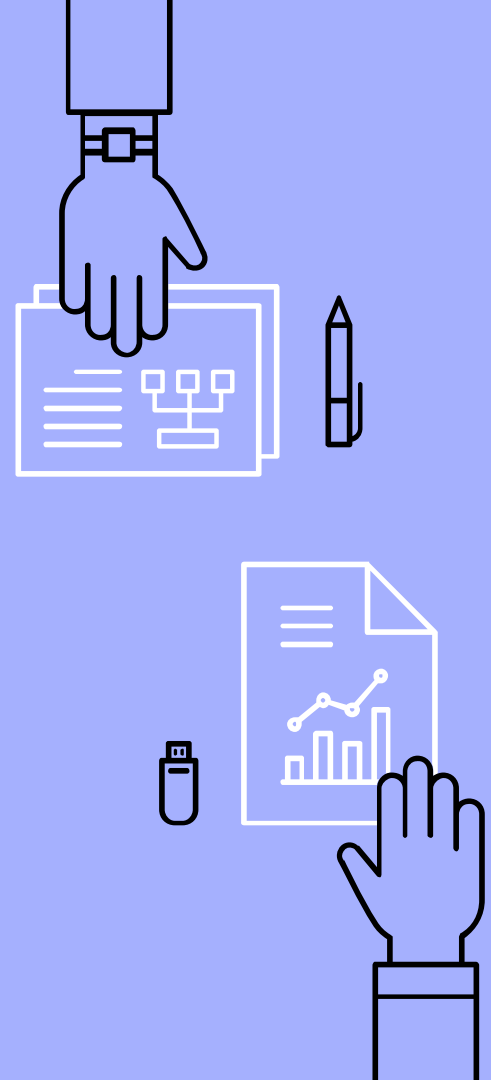
What Research Tells Us

- ▶ Significant improvements were shown in:
 - Reading Comprehension
 - Vocabulary (Park et al, 2017)
 - Increase in motivation to read
 - Improved fluency on assessments (White, 2014)

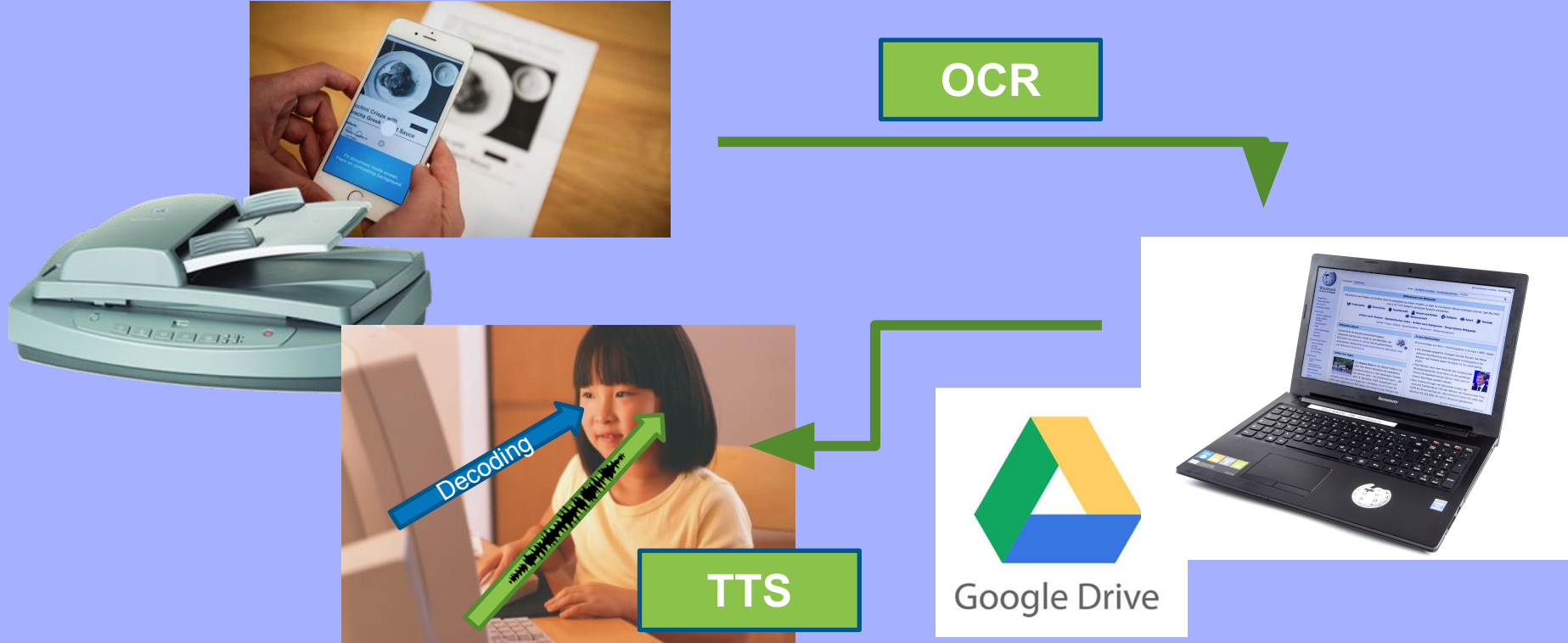


Conflicting Research

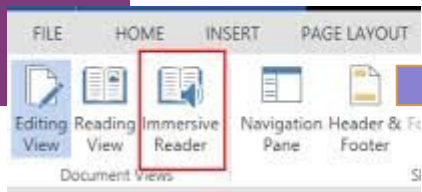
- ▶ Listening to text while reading it did not improve total reading comprehension compared to a silent reading condition (Schmitt, 2011)
- ▶ No significant improvement in reading fluency, text comprehension, and time taken to complete readings (Meyer, 2014)



Optical Character Recognition (OCR)

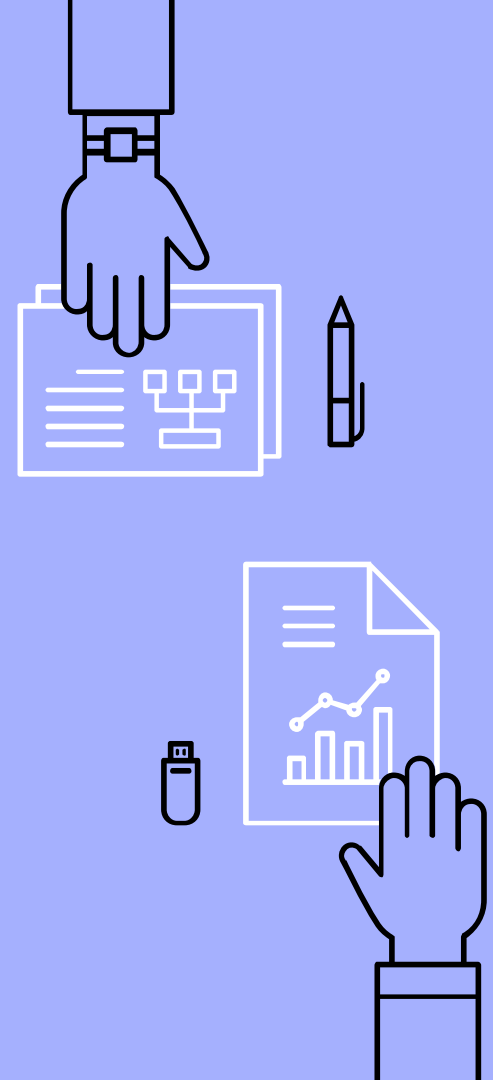


Text-to-Speech (TTS) Mini Study (April 2019)



What We Found

- ▶ The type of document used impacts the ease of use
- ▶ Immersive Reader and Read & Write did not significantly differ in their ease of use

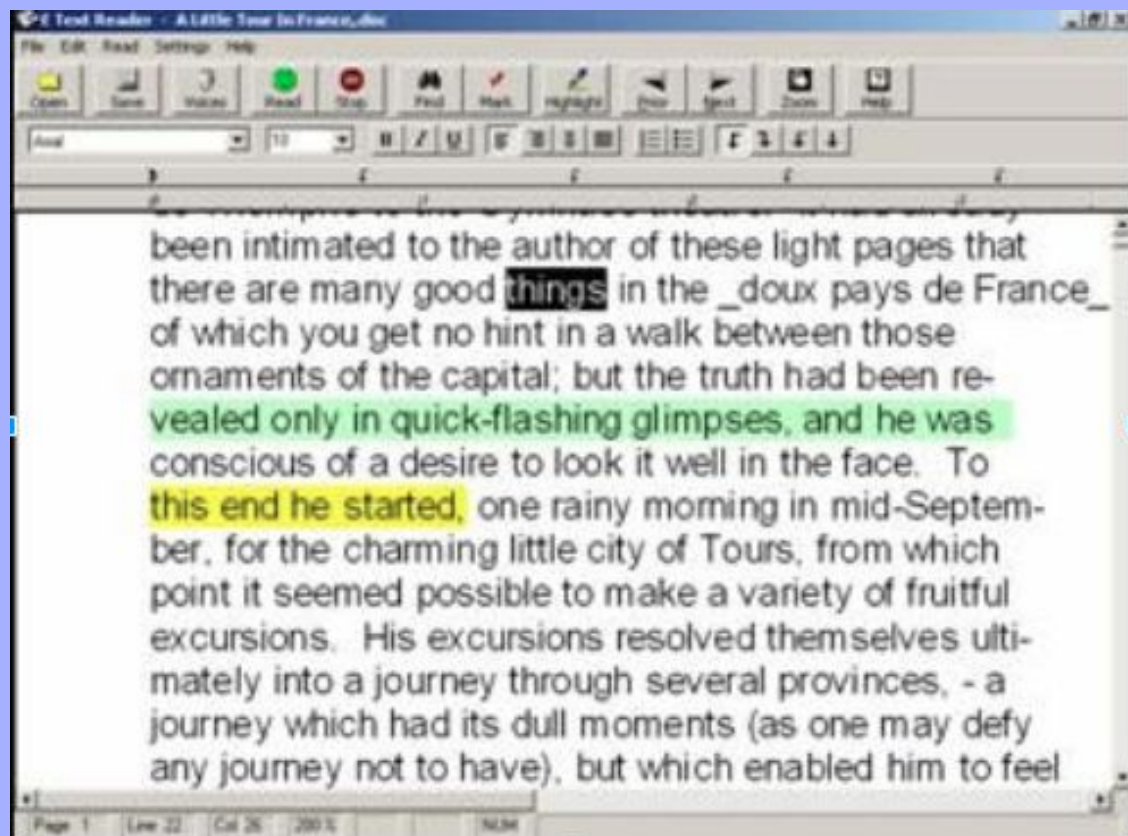


Immersive Reader

Read and Write

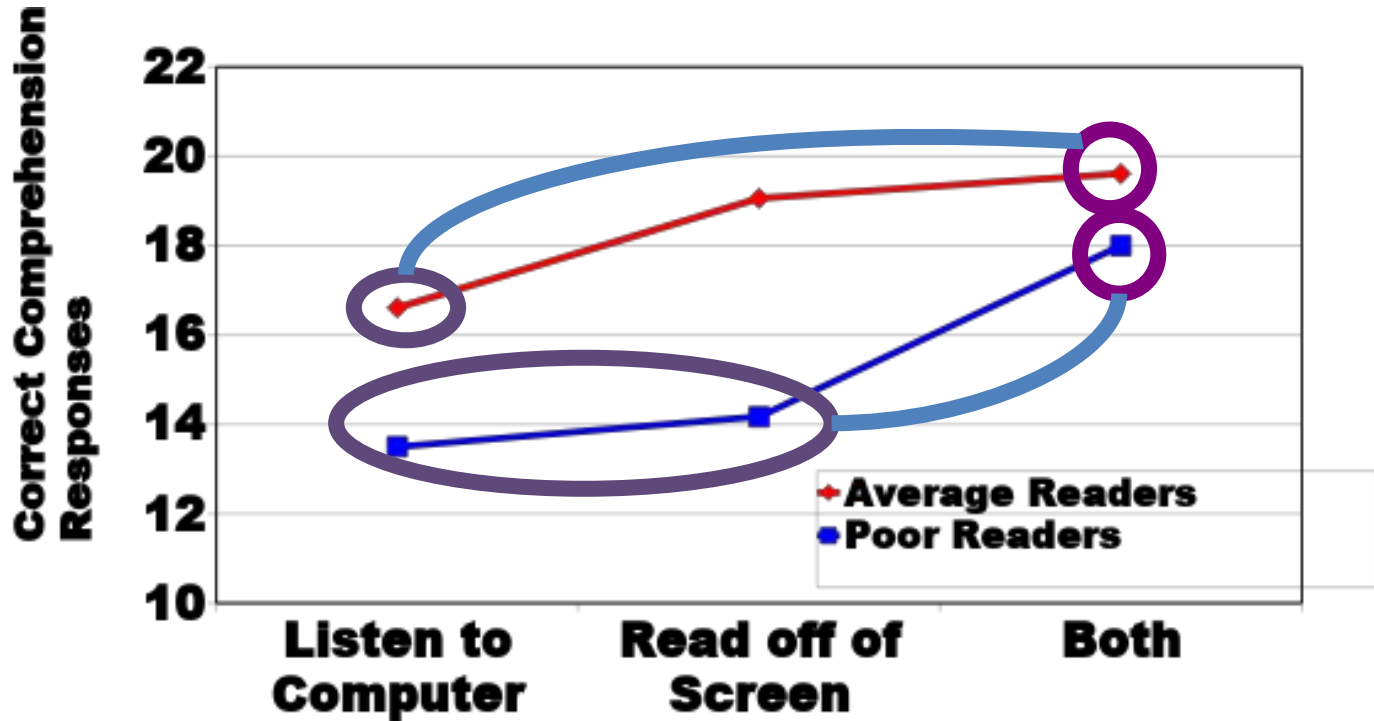
<i>Text Document</i>	5	4
<i>Scanned Text</i>	18	12
<i>Worksheet</i>	15	6

Bimodal Reading



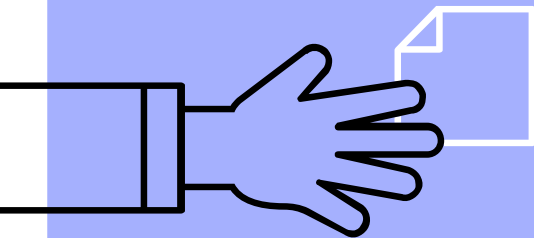
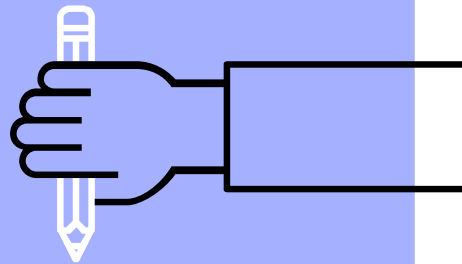
(Todd Cunningham, 2012)

Bimodal Reading



(Montali & Lewandowski, 1996)

Activity: TTS Voices



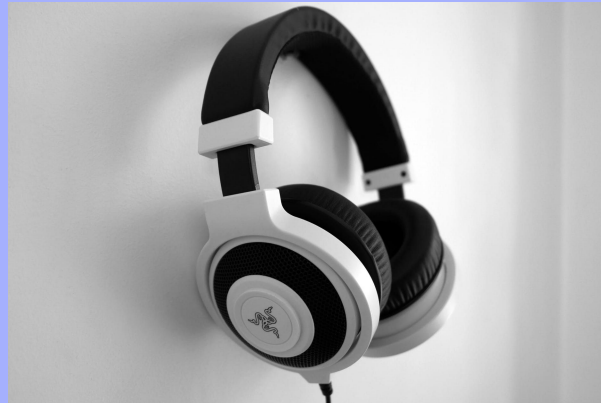
TTS Voices

- ▶ Choose a high-quality voice
- ▶ Over 80 languages to choose from
- ▶ Female voice preference
- ▶ As human sounding as possible

(ATSelect, 2019)



Classroom Challenges



Product

Choose a product that suits the needs of your students.

Ensure product has necessary features.

Considerations

Ensure that the student can control the reading speed.

Program must have bimodal reading capability.

Select a small amount of text at any one time.

Finding the right voice is critical.

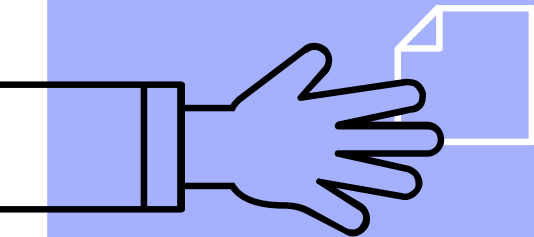
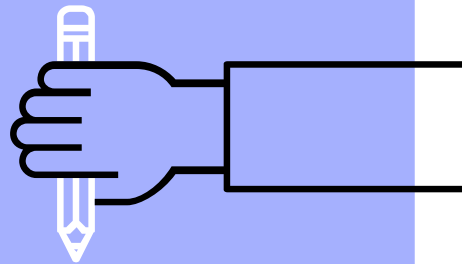
Implementation

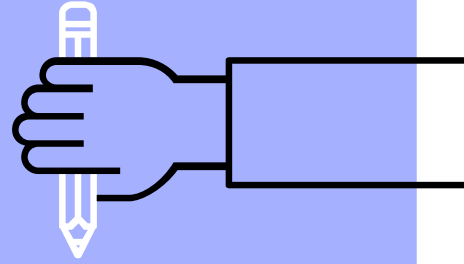
Use documents in electronic form.

Ensure documents have readable text.

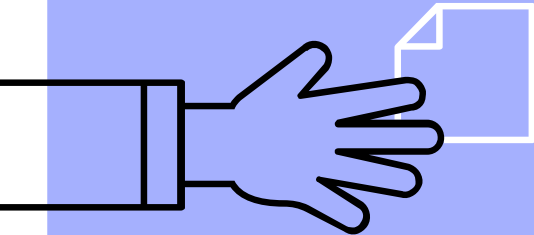
Make sure that students have headphones or a quiet space to work.

Voice Recognition





Which VR programs have you
used?

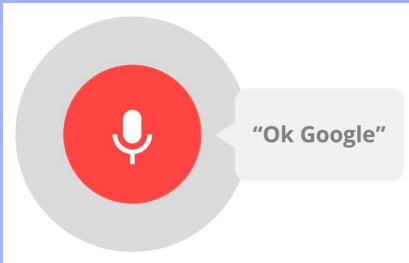
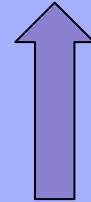
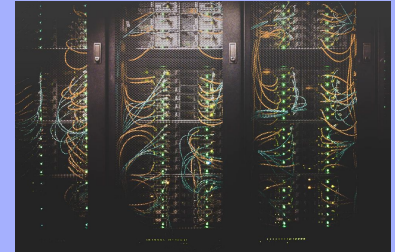
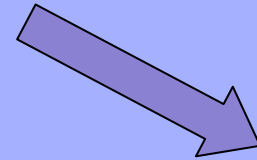
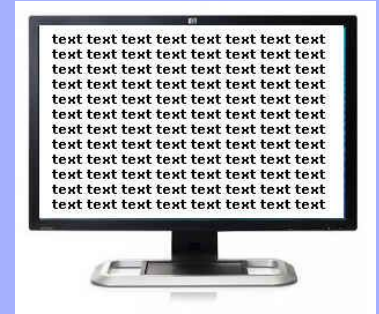
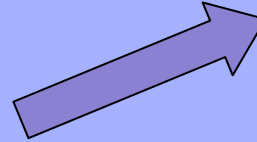
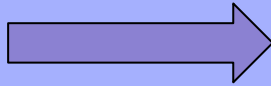


VR can:

- ▶ Recognize and translate spoken language into written text
- ▶ Enable the user to:
 - Talk naturally to the computer, which will record exactly what they said as text
 - Speak commands enabling hands-free computing



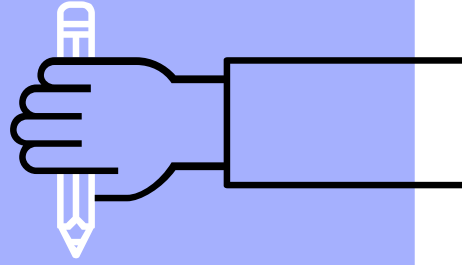
Voice Recognition (VR)



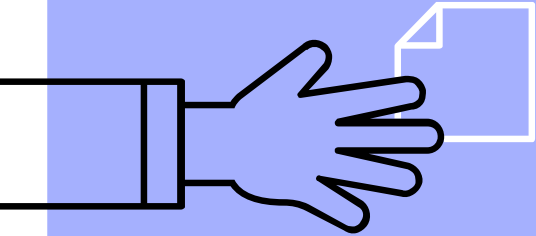
What Research Tells Us

- ▶ Improve performance of students who struggle with writing
 - Students with LDs (Higgins & Raskind, 1995)
 - ELLs (Arcon et al. 2017)
- ▶ Aid students with physical disabilities (Garrett et al., 2011)
- ▶ Help students write more efficiently (Collins, 2014)





Let's try it!



Voice Recognition (VR) Mini Study (August 2017)

Syllables per second	Condition	Number of Trials	Total errors (<i>n</i>)	
			<i>M</i>	<i>SD</i>
Over 4	Client-Side	3	4.33	1.15
	HS-Clear	3	166.33	25.74
	HS-Preloaded	3	289.33	15.50
	LS-Clear	3	294.33	19.30
	LS-Preloaded	3	310.33	22.14
Under 4	Client-Side	3	12.00	13.08
	HS-Clear	3	88.67	17.56
	HS-Preloaded	3	165.67	54.17
	LS-Clear	3	103.33	17.21
	LS-Preloaded	3	106.00	85.71

*Taming the Dragon

- ▶ Various Dragon products suited for different productivity needs
- ▶ Allows users to “train” program to recognize their voice, word pronunciation, and speech patterns



Classroom Challenges



Product

Ensure product is appropriate for intended use.

Ensure product has high accuracy rate.

Considerations

Program must be used in a quiet space.

Student must speak slowly and clearly.

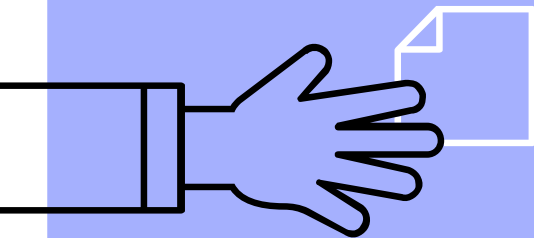
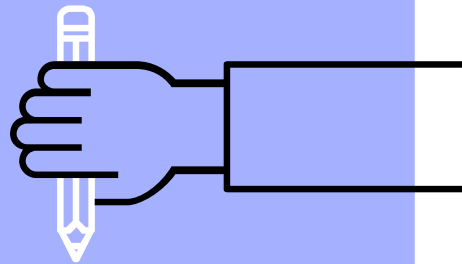
A proper microphone must be used in order to ensure accuracy.

Implementation

Make sure that students have headphones or a quiet space to work.

Consider other options at school if a quiet space is not possible and use VR for homework.

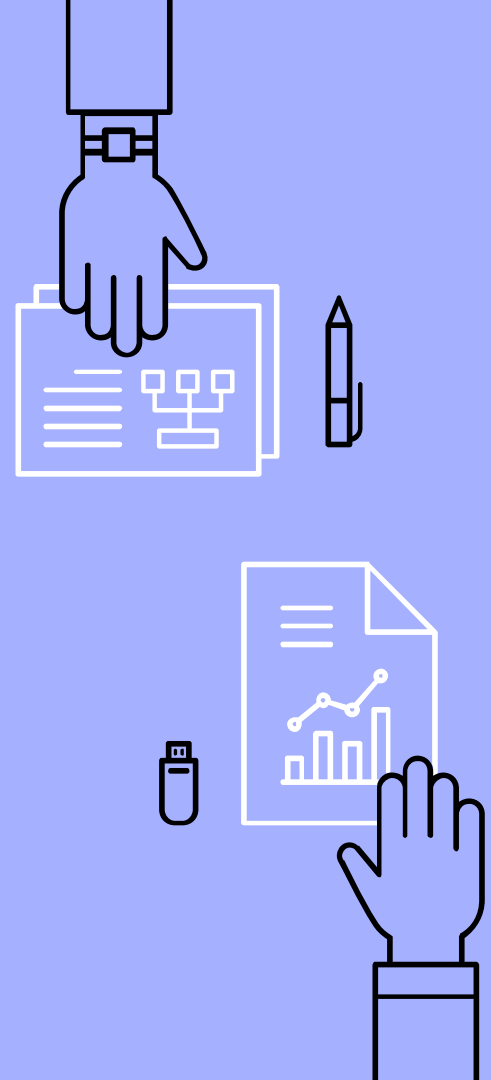
Editing Assistance





Functions

- ▷ Provide corrections, suggestions, and tips
- ▷ Plagiarism-detection and proofreading functions
- ▷ Training games
- ▷ AI developed by experts in linguistics



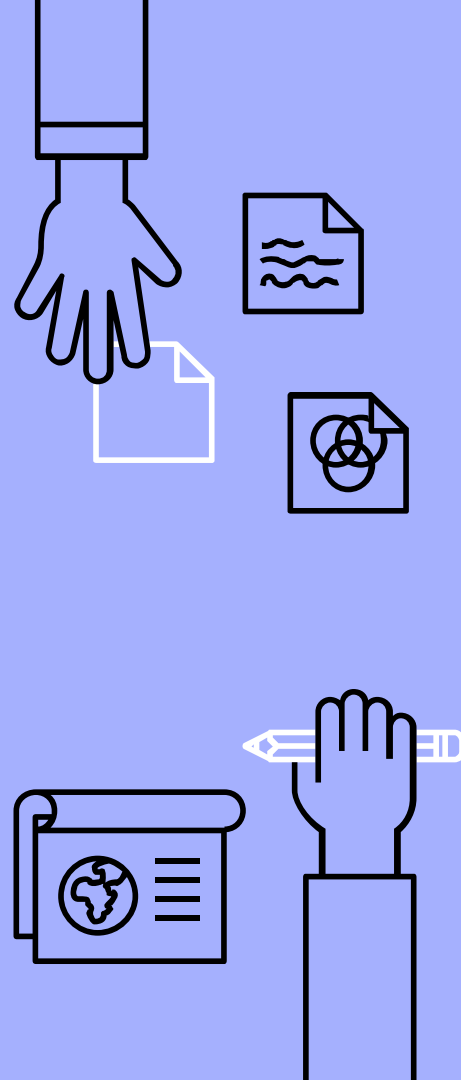
Claims

- ▷ Useful for students who struggle with grammar or who are new English Language Learners

Challenges

- ▷ Penalize grammatical edits that are correct but not in the gold standard and over-identifying “errors”

(Napoles, Sakaguchi & Tetreault, 2016)



Classroom Challenges



Editing Assistance Mini-Study (April 2019)

Sentences

Written by
ELL
students
as part of
a larger
study



Editing Assistance Programs

Grammarly, Ginger,
MS Word, and
Google Docs

Compared to
human raters



Compare Effectiveness

Grammarly caught the
most errors by far,
however the humans
were still far superior

Ginger made the most
incorrect corrections

“

The brid is sing.



• CORRECTNESS: SPELLING

brid → **bride** **bird**

The word **brid** is not in our dictionary. If you're sure this spelling is correct, you can add it to your personal dictionary to prevent future alerts.



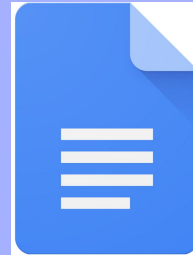
The **bride** is sung x
The **brid** is sing.



The **brid** is sing.

bird
brad
bred
bride
Brid

Ignore All



The **brid** is sing

Did you mean:

bird

Feedback on suggestion

Ignore all

Always correct to "bird"

Add "brid" to dictionary

The **brid** is sing

Consider changing to:

singing

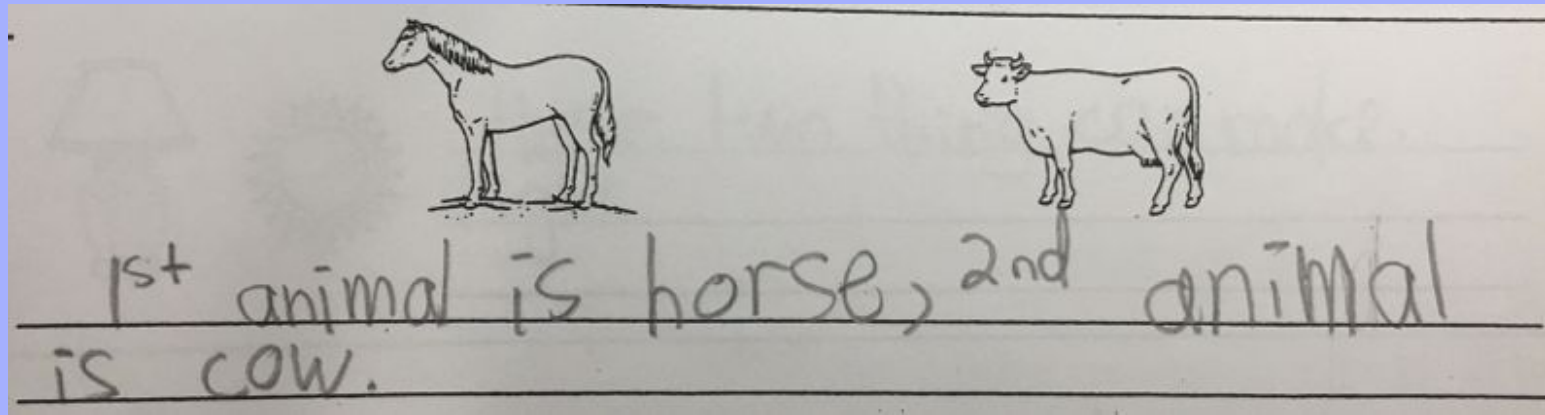
Feedback on suggestion

Ignore

Spelling and grammar check

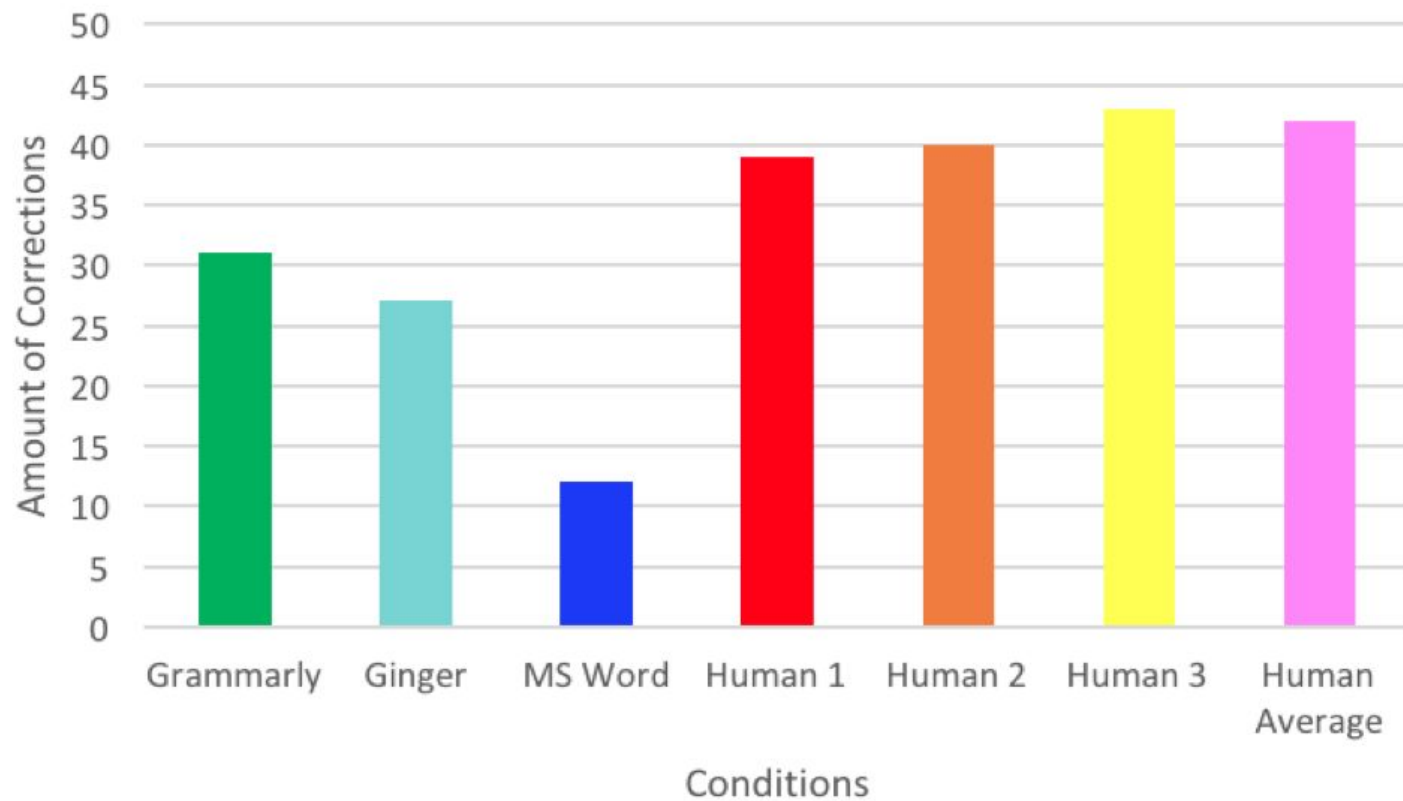
⌘+Option+X

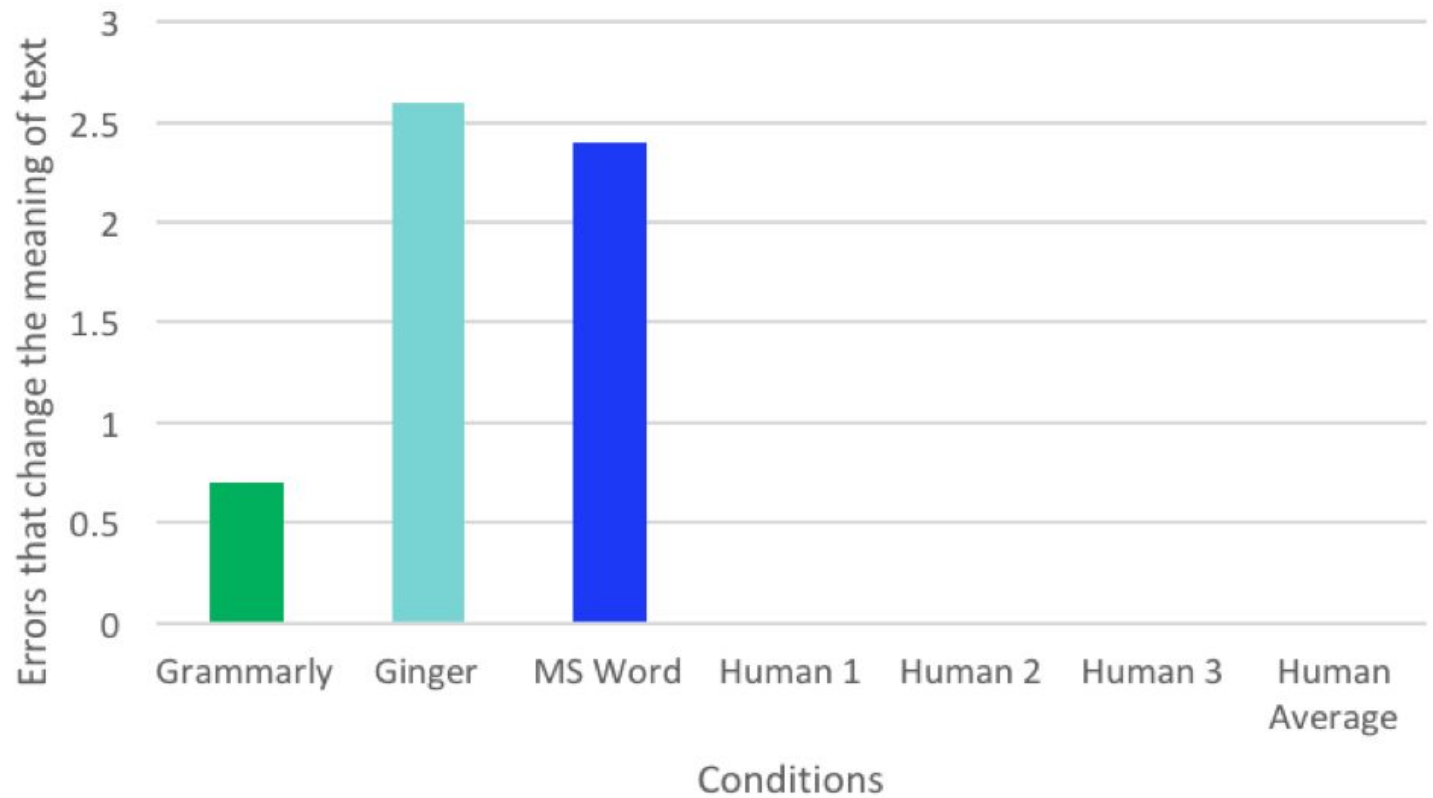
Ginger



1st animal is horse, 2nd animal is cow.

The animal is cowardly ×





Product

Choose a product that suits the developmental level of your students.

If using Editing Assistance, choose Grammarly.

Considerations

What is the age of the student (and developmental level)?

Do they get frustrated with the spell check lines?

Is the student's spelling strong enough to use Editing Assistance?

Implementation

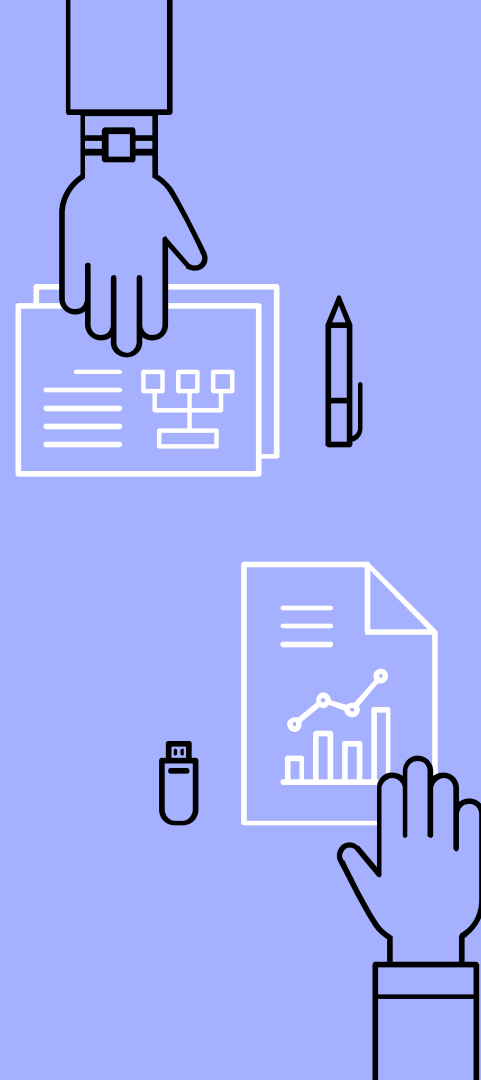
Make using the programs a part of your classroom routine.

Have it available on all computers (and at home).

Do training on what corrections to accept or not accept

So, what do we know about editing assistance?

- ▷ Not created equal
- ▷ Require strong EF skills
- ▷ Not the be-all end-all
- ▷ May not pick up really bad spelling errors
- ▷ May be more useful for typical users who are not English language learners and do not have a learning disability.

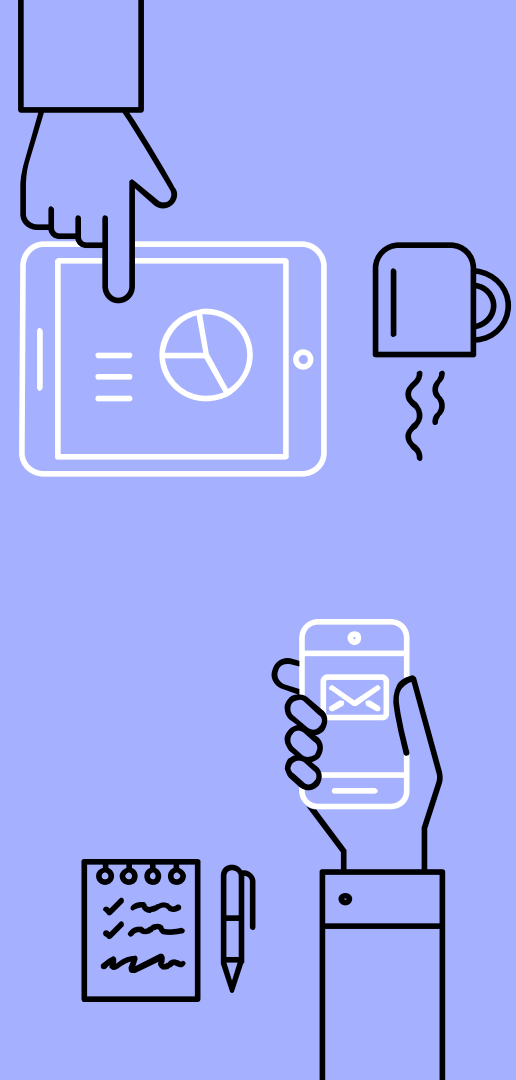


Main Takeaways

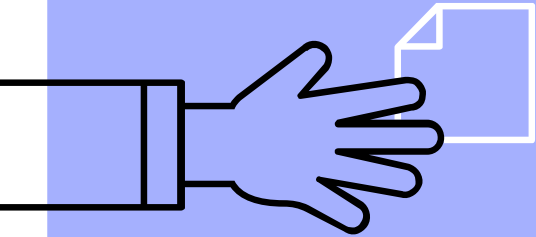
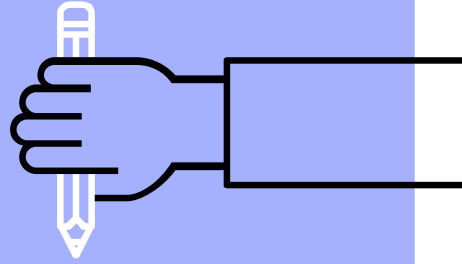
Worksheets are a challenge for students when using TTS. Provide digital options for easiest implementation.

Find a quiet space for students to work or consider options other than VR.

Turn off automatic spell check to ensure that students' writing idea flow is not interrupted.



Questions?



Thank you for your time!

Bronwyn Lamond, MA, OCT

bronwyn.lamond@mail.utoronto.ca

Hillary Scott, B.A.

Mirelle D'Mello, B.Sc., OCT

Todd Cunningham, PhD. C.Psych

todd.cunningham@utoronto.ca



@atselect_oise



@atselect_oise



**Academic
Intervention Lab**



**www.Academic
InterventionLab.com**