



UNIVERSITY OF TORONTO
OISE | ONTARIO INSTITUTE
FOR STUDIES IN EDUCATION

Breaking Down Writing to Build Up Students: New Research, Strategies & Tools

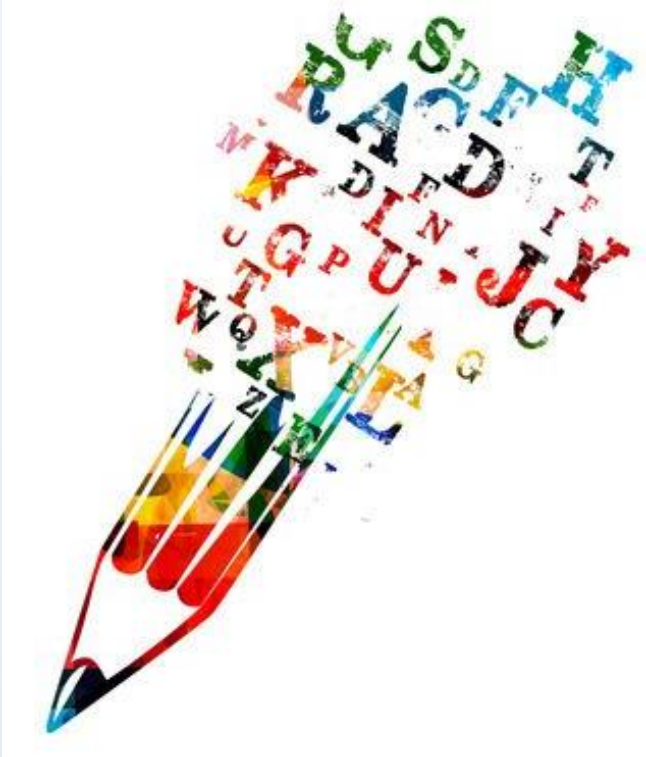
Emily Staffiere, Francis Wall &
Dr. Todd Cunningham

Ontario Institute for Studies in Education
School and Clinical Child Psychology

Assistive vs. Educational Technology



Writing Activity



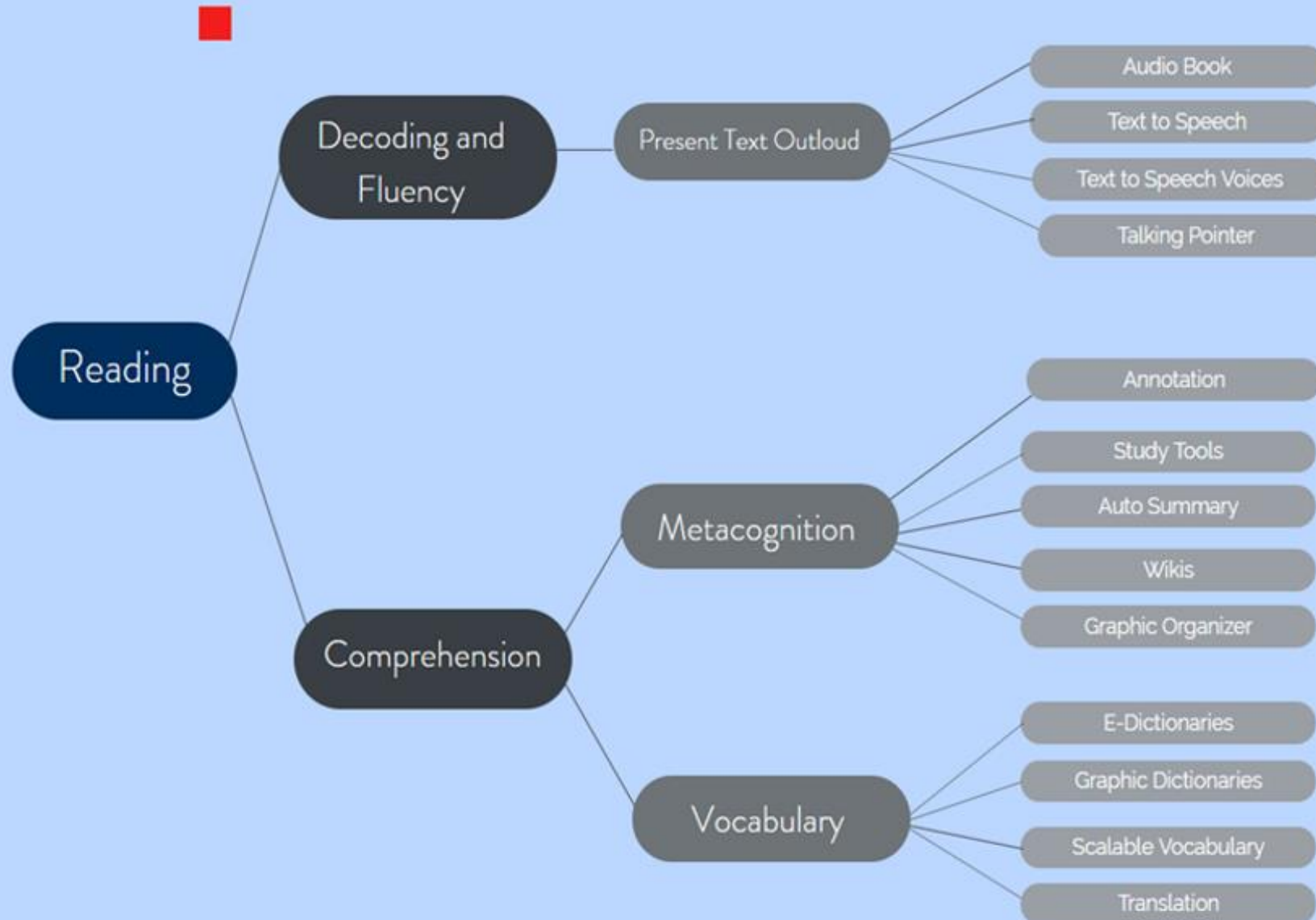
The captain was nervous when she saw a storm on the horizon. Just then...

Component Skills of Writing

"a writer in the act is a thinker on full-time cognitive overload"

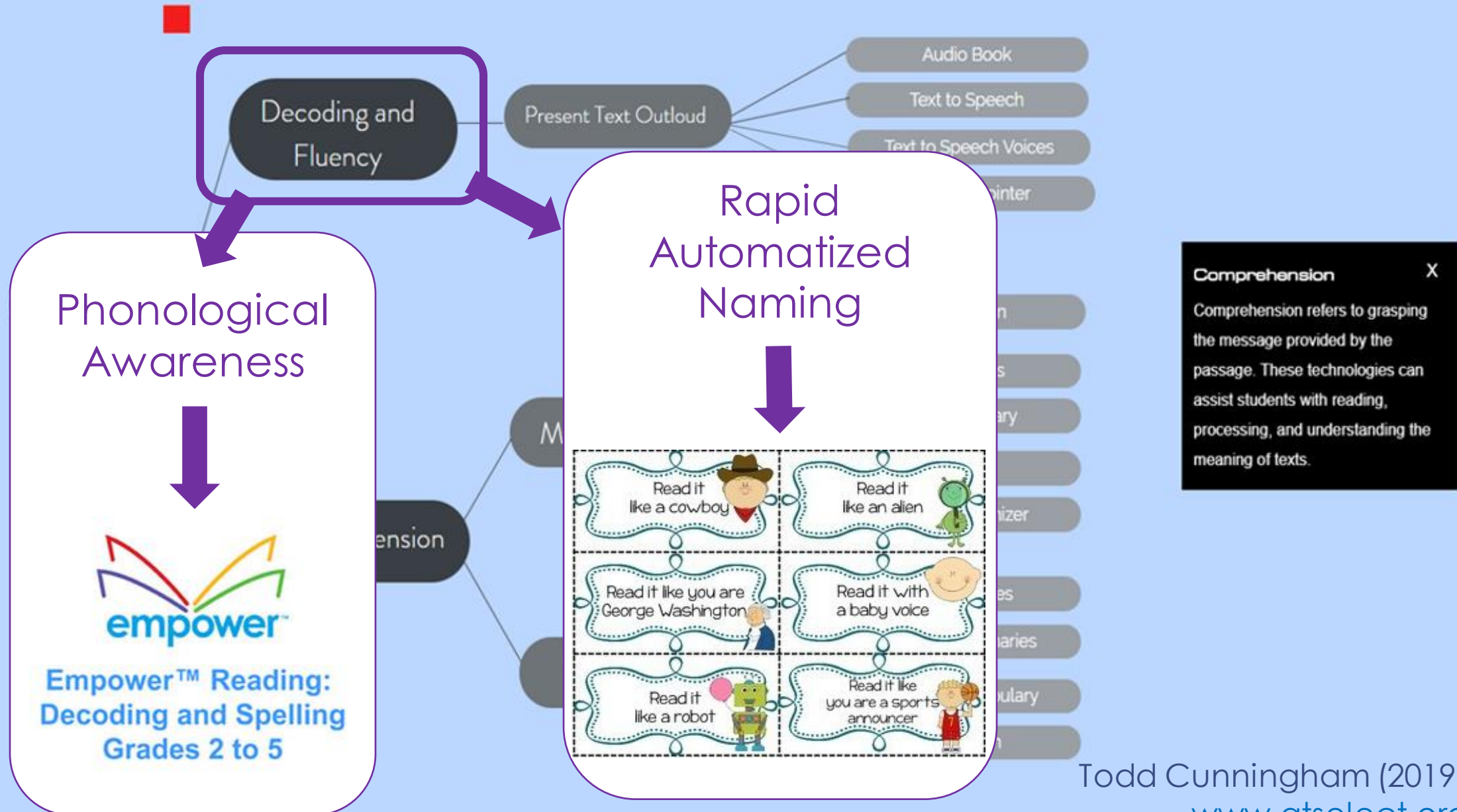
Flower & Hayes, 1980



**Comprehension**

X

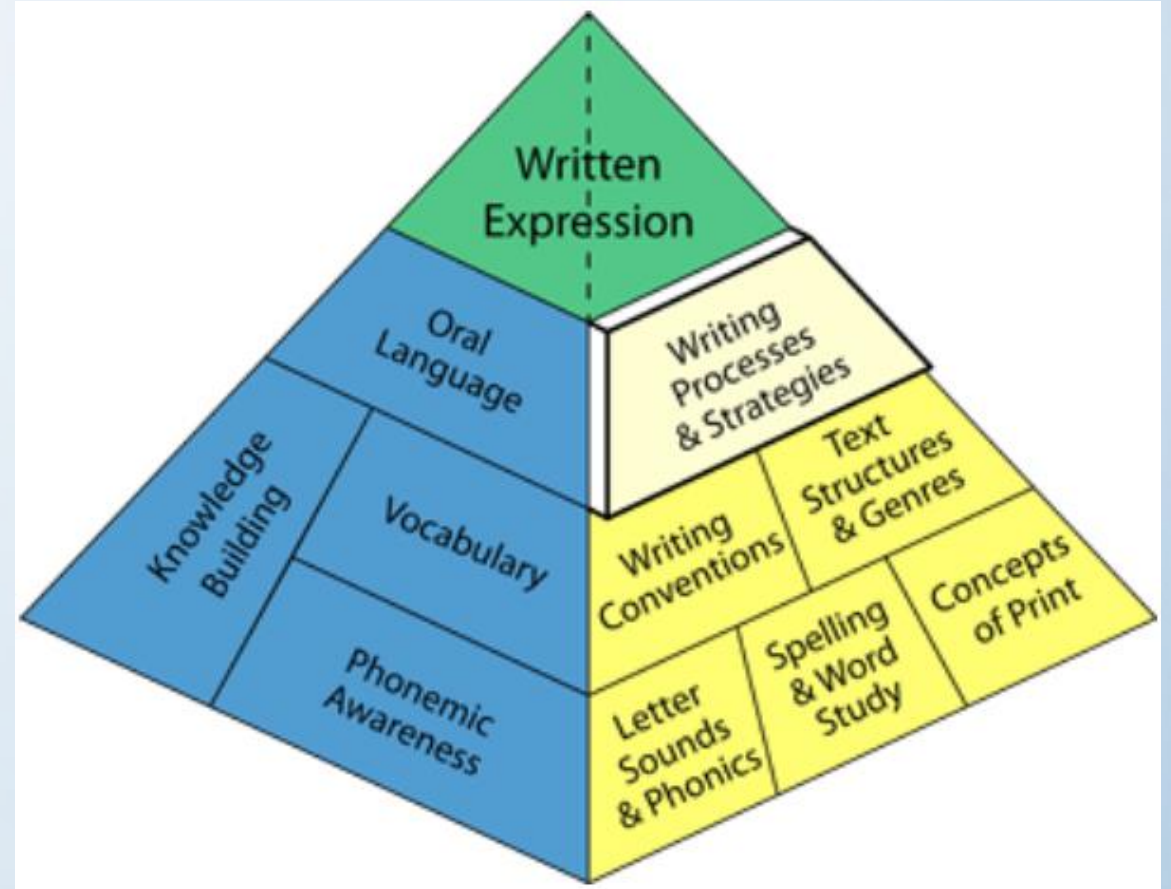
Comprehension refers to grasping the message provided by the passage. These technologies can assist students with reading, processing, and understanding the meaning of texts.



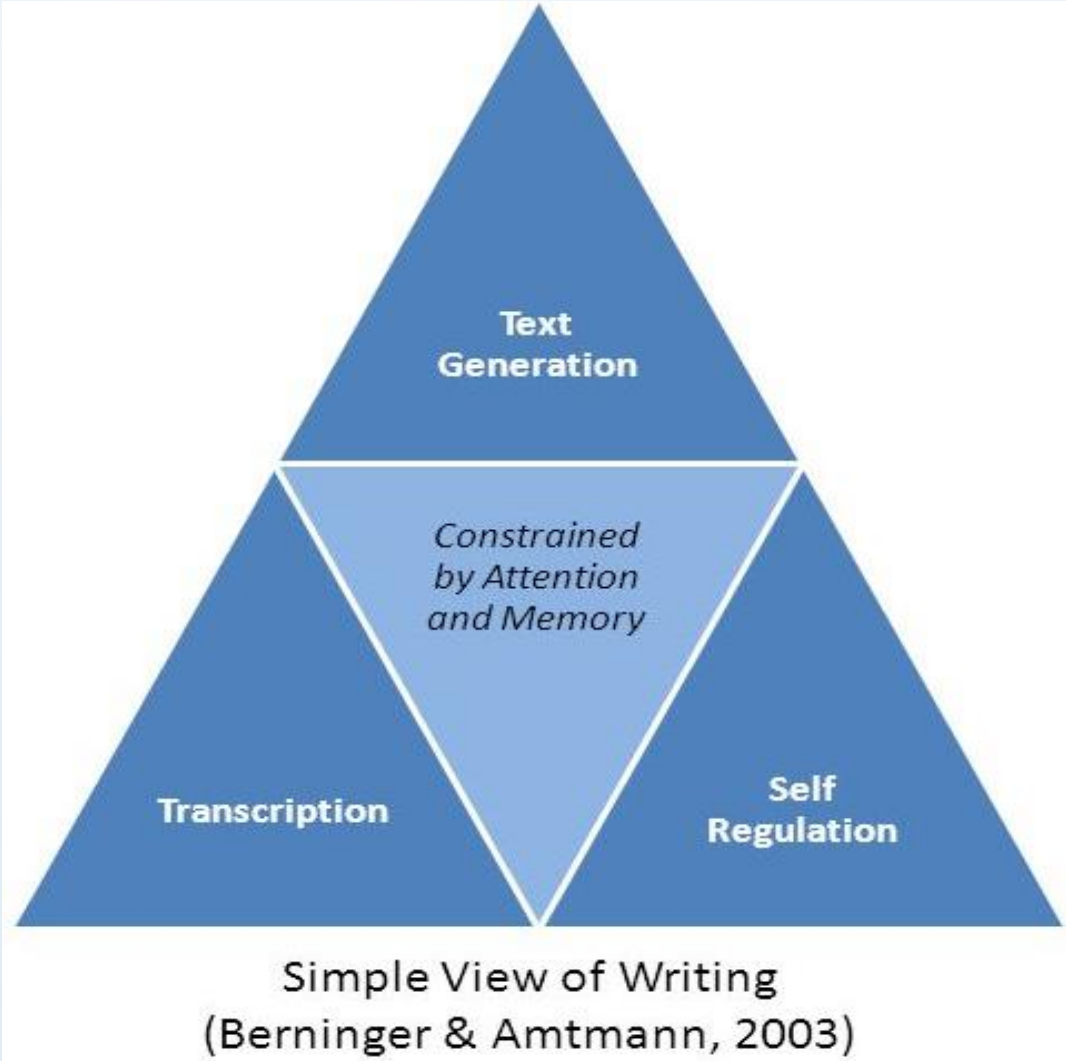


Writing Research

- Extreme variance in studies/design
- Writing quality vs. Writing production
- Handwriting fluency, spelling, reading, oral language



What we know...



- Quality > quantity
- Reading & production: stronger in primary grades
- Transcription skills = foundational
- Assistive technology

Keyboard Activity

When the sunlight strikes raindrops in the air, they act as a prism and form a rainbow.

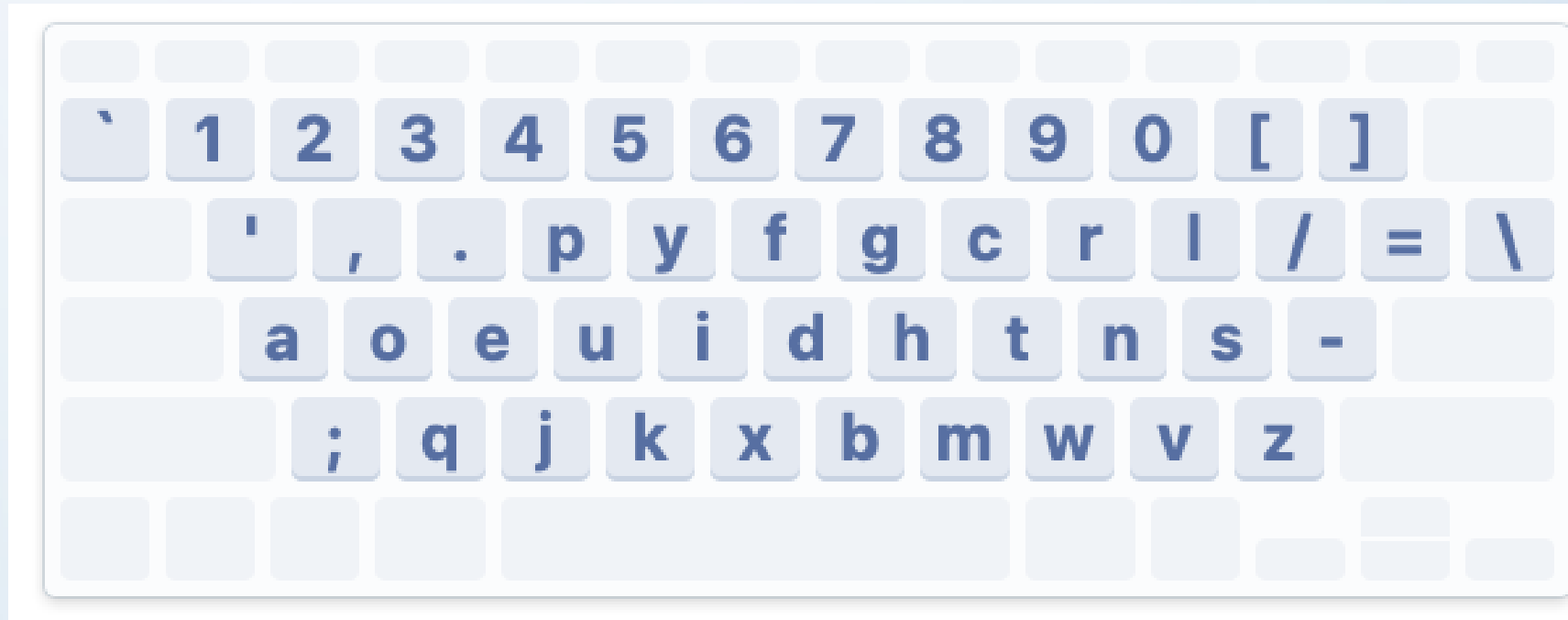
Fairbanks, G. (1960)



Copy: When the sunlight strikes raindrops in the air, they act as a prism and form a rainbow.

When the sunlight strikes raindrops in the air, they act as a prism and form a rainbow.

Fairbanks, G. (1960)



Copy: when

Typing

- Automaticity is key
- Average of 20 WPM for proficiency (non-LD)
- Typing speed increases with age
- LD students make more revisions
- Needing updates

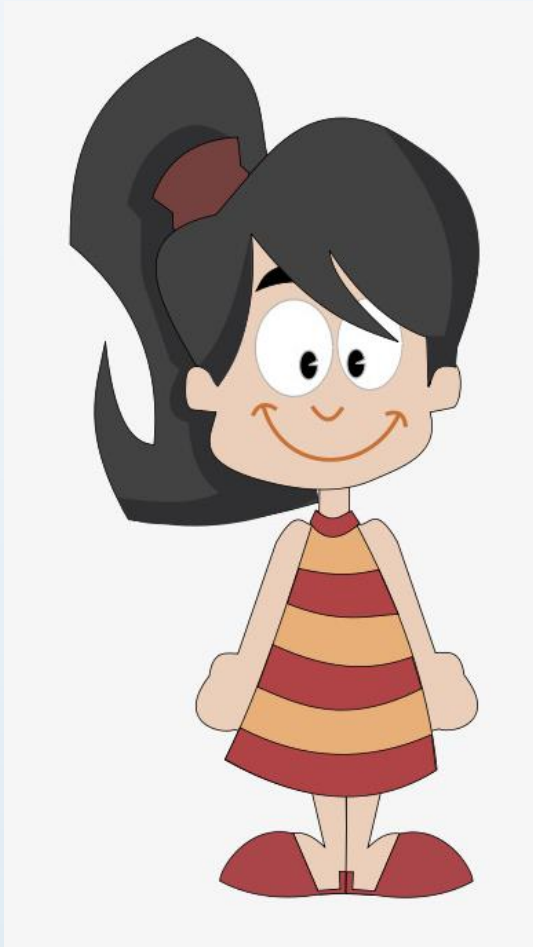


Preminger, Weiss & Weintraub (2004)
Russell (1999)
Berninger et al. (2009)
MacArthur & Graham (1987)

ATSELECT.org

Please take out your cellphones

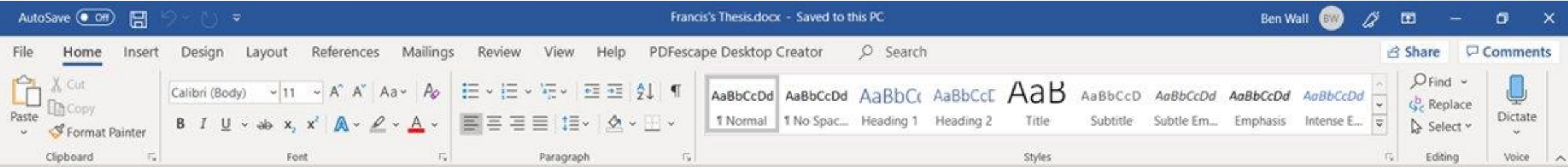
Vignette - Anika



- Difficulties writing a research essay
- Spelling at grade level
- Ideas not fully developed or logically laid out
- No other difficulties at school
- Extensive support from teachers with multiple drafts

Idea Generation...





Francis could I get
an update on your
thesis? Everything
going well?
-Dr. Cunningham

It's going great,
thanks for checking
in Todd
-Francis

...Or not



dinosaurs



Google Search

I'm Feeling Lucky

Google offered in: [Français](#)

People also ask

Which dinosaurs are still alive today?

What dinosaurs lived in Canada?

What dinosaurs lived in each period?

What was the first dinosaur that ever lived on Earth?

Dinosaurs | Fox News

<https://www.foxnews.com/category/science/archaeology/dinosaurs>

Mysterious new lizard found inside 125-million-year-old flying **dinosaur**. Researchers have found the fossilized remains of a new species of lizard inside the stomach of a small flying **dinosaur** known as a microraptor.

5 dinosaurs that called Canada home | Explore | Awesome Activities ...

<https://www.cbc.ca/kidscbc2/the-feed/5-dinosaurs-that-called-canada-home> ▼

The Tyrannosaurus rex (T. rex to his friends), probably the most famous **dinosaur**, lived in Canada during the Cretaceous period, between 65 to 67 million years ...

Dino Directory Name A-Z - Dinosaurs beginning with the letter T ...

<https://www.nhm.ac.uk/discover/dino-directory/name/t/gallery.html> ▼

Discover facts about **dinosaurs** beginning with the letter T, including Tyrannosaurus rex, Troodon and Triceratops. Explore their diets, when they lived and where ...

Dinosaurs: News & Pictures of Dinosaur Types - 2019 News and ...

<https://www.livescience.com/topics/dinosaurs> ▼

Dinosaurs types are many and varied, from small bird-like creatures to the largest animals ever to walk on Earth. The subject of blockbuster films, history museum exhibits and much more, **dinosaurs** continue to interest people today after first appearing approximately 230 million years ago.

Dinosaurs – T rex and the other Schleich® dinos

<https://www.schleich-s.com/en/CA/dinosaurs.html> ▼

Small and nimble, big and strong, massive and winged – with **dinosaurs** in all shapes and sizes, you'll never be bored again! Discover the primordial giants, ...

Zoom Dinosaurs - EnchantedLearning.com

<https://www.enchantedlearning.com/subjects/dinosaurs/> ▼



How do I make



how do i make **buttermilk**
how do i make **google my default**
how do i make **money**
how do i make **friends**
how do i make **hummingbird food**
how do i make **a pdf file smaller**
how do i make **hard boiled eggs**
how do i make **an app**
how do i make **a gif**
how do i make **more money**

Google Search

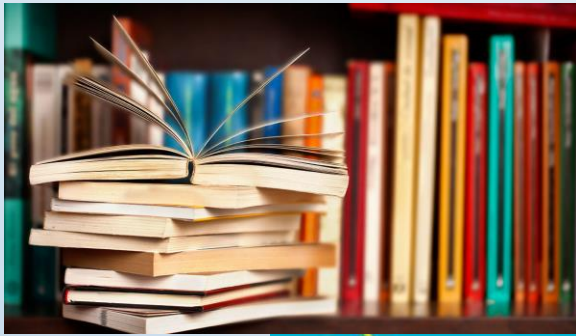
I'm Feeling Lucky

Report inappropriate predictions

Research

Vs

Idea Generation



- Given your topic of DINOSAURS, here is the most relevant **CONTENT INFORMATION**
- Given your topic of DINOSAURS, here is what **OTHER PEOPLE INTERESTED** were looking at

WordStorm

the visual brainstorming tool

lonij.net

| wordstorm

| help

| contact



Enter a word

dinosaur

GO

Number of words

20

Export

Description:

edmontosaurus,

(n.) duck-billed dinosaur from Canada found
as a fossilized mummy with skin

birds

archaeopteryx

styracosaurus

paleontologists

iguanodon

diplodocus

skeletons

edmontosaurus

fossils
formation

dinosaurs

theropod

dinosaur

extinction

deinosuchus

prehistoric

horned

bipedal

herbivorous

triceratops

<https://www.wordstorm.ca/>

How good is it, really?

Compare lists made by humans and lists made by machines



???	???	???
Justin Trudeau	Ontario	Beaver
Maple Leaf	Streaming	Bryan Adams
Tim Hortons	Saskatchewan	Maple Leaf
Hockey	British Columbia	Bacon
Eh	Britain	Tim Hortons
Sorry	French	Hockey
Nice	North	Winter
Toronto	Freedom	Camping
Cold	Winter	Mounties

"CANADA"

HUMAN	Word Storm	HUMAN
Justin Trudeau	Ontario	Beaver
Maple Leaf	Streaming	Bryan Adams
Tim Hortons	Saskatchewan	Maple Leaf
Hockey	British Columbia	Bacon
Eh	Britain	Tim Hortons
Sorry	French	Hockey
Nice	North	Winter
Toronto	Freedom	Camping
Cold	Winter	Mounties

"CANADA"

???	???	???
Balloon	Socialize	Republican
Streamers	Birthday	Democrat
Confetti	Fun	Communist
Cake	Cake	Opposition
Holiday	Celebrate	Birthday
Celebration	Games	Fun
Birthday	Food	Surprise
Graduation	Friends	Celebration
Candles	Presents	Present

"PARTY"

HUMAN	HUMAN	WORD Q
Balloon	Socialize	Republican
Streamers	Birthday	Democrat
Confetti	Fun	Communist
Cake	Cake	Opposition
Holiday	Celebrate	Birthday
Celebration	Games	Fun
Birthday	Food	Surprise
Graduation	Friends	Celebration
Candles	Presents	Present

"PARTY"

???	???	???
Robot	Computer	Robot
Computer	Apocalypse	God
Coding	Evolution	Discovery
Intelligence	HAL	Genius
Sophia	Google	Computer
World Domination	iRobot	Asimov
Lucy	Superior	Cortana
Technology	Skynet	Sacred

"Artificial Intelligence"

Human	Human	Word Q
Robot	Computer	Robot
Computer	Apocalypse	God
Coding	Evolution	Discovery
Intelligence	HAL	Genius
Sophia	Google	Computer
World Domination	iRobot	Asimov
Lucy	Superior	Cortana
Technology	Skynet	Sacred

"Artificial Intelligence"

???

???

???

Classroom

Pedagogy

Learner

Salary

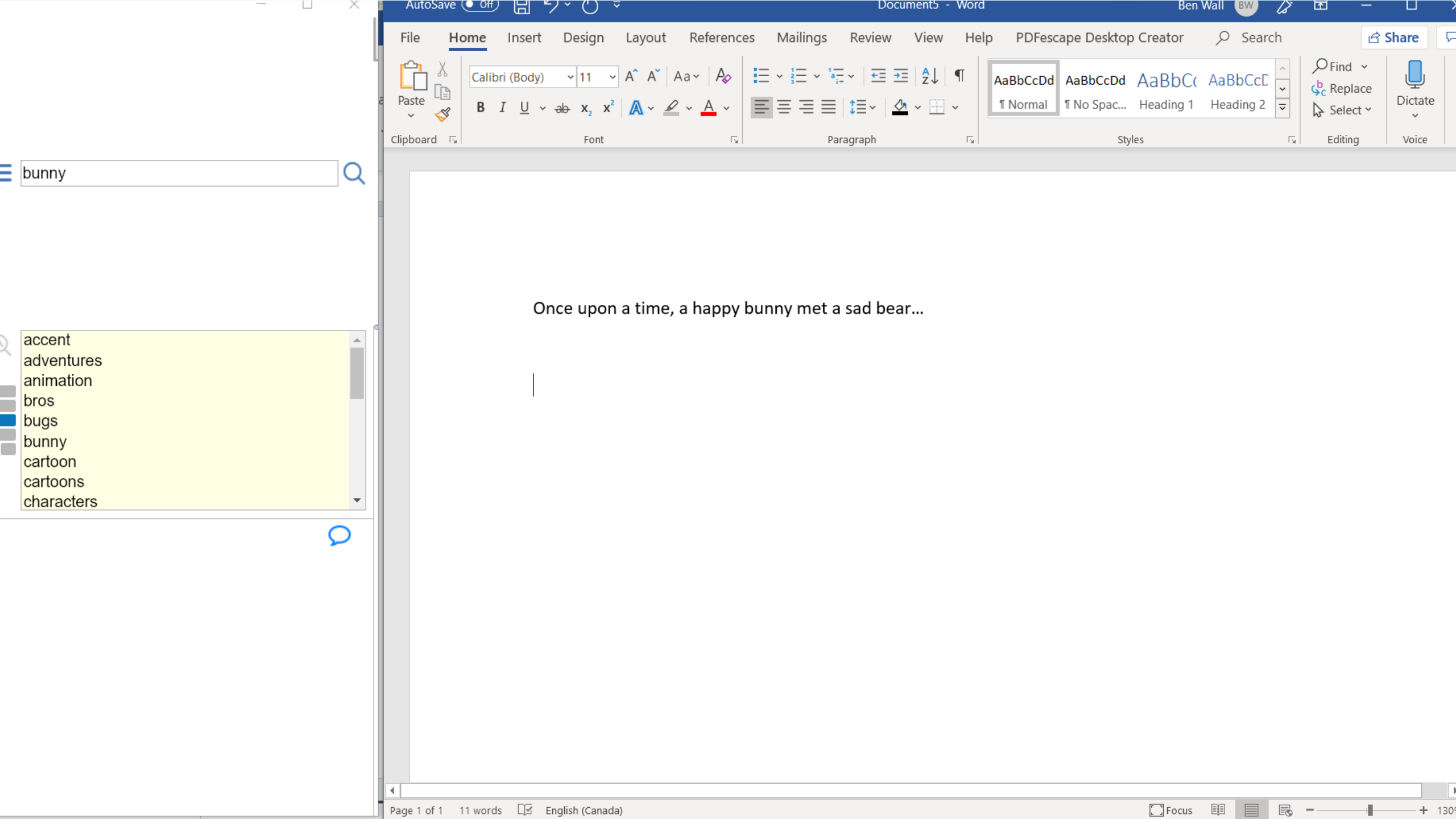
Pupil

“Teacher”

Word Association	Human	Human
Classroom		
Pedagogy		
Learner		
Salary		
Pupil		

“Teacher”





File Home Insert Design Layout References Mailings Review View Help PDFescape Desktop Creator Search Share

Paste

Clipboard

Font

Paragraph

Styles

Editing

Voice

Find

Replace

Select

Dictate

bunny

- accent
- adventures
- animation
- bros
- bugs
- bunny
- cartoon
- cartoons
- characters

Once upon a time, a happy bunny met a sad bear...

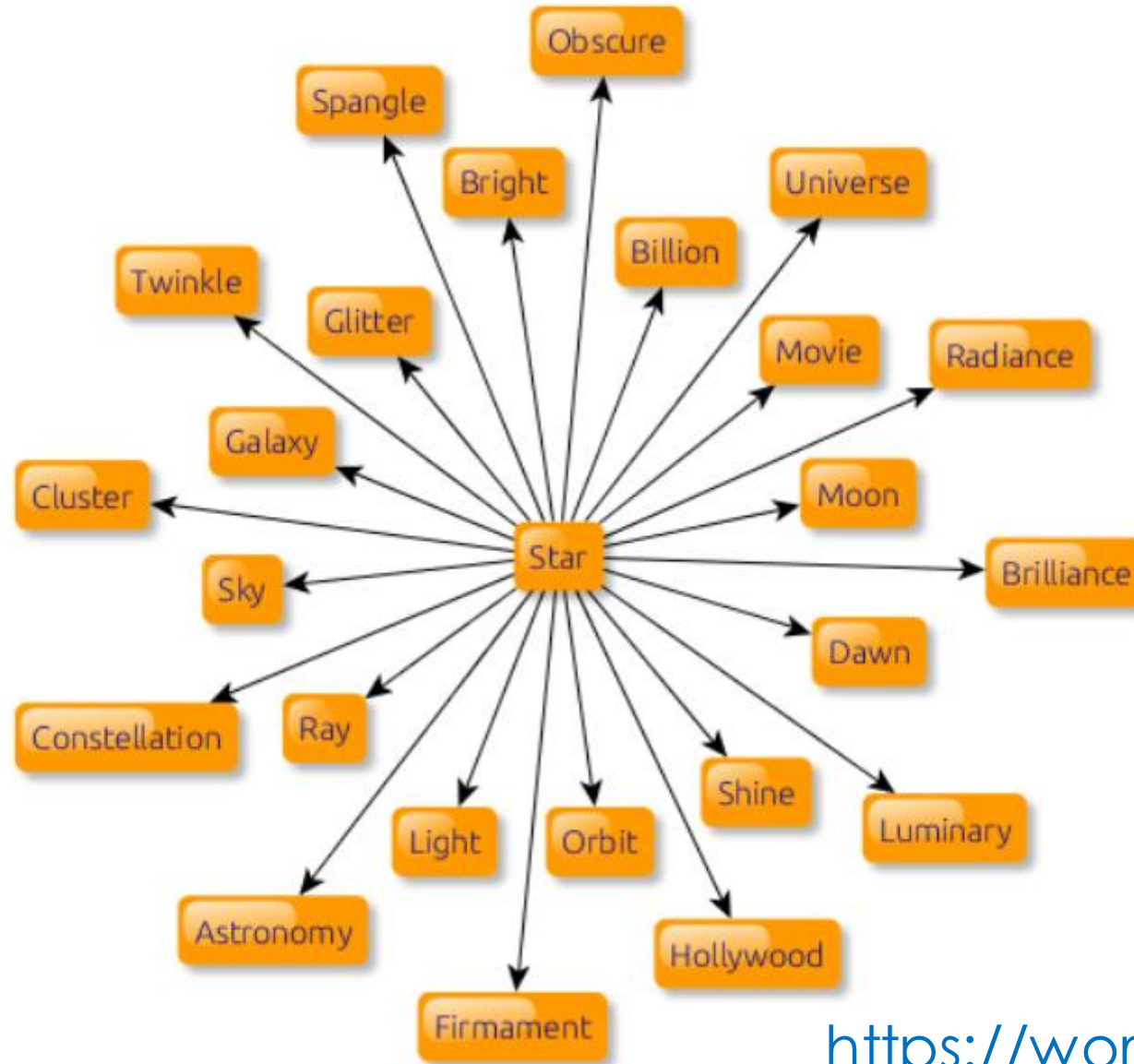
Between-Group

	Control Group	Idea Generation	4 Square Organizer	Both together
Time to start	0:00	0:00	0:00	0:00
Word count	89.3 words	147.2 words	129.6 words	121.8 words
# Sentences	4.1	6.6	5.9	5.4
# Independent thoughts	3.2	5.4	3.9	3.8
Did you find it useful?	12.5% Yes	75% Yes	75% Yes	62.5% Yes

Within-Group

	Control Group	Idea Generation	4 Square Organizer	Both together
Word count (with nothing)	89.3 words	105.1 words	105.6 words	123.5 words
Word count (with tool)	84.1 words	147.2 words	129.6 words	121.8 words
% increase	-6%	40%	23%	-.9%

Should you start using idea generators?



Take-Home Points

- ✓ Typing training may be the next big thing
- ✓ Idea generators have potential, but we're only just starting to study how to use them and how / if they really work
- ✓ ATSelect.org is a free resource to find and learn about assistive technology

QUESTIONS?

THANK YOU FOR LISTENING!

Emily Staffiere, BSc

emily.staffiere@mail.utoronto.ca

Francis Wall, BSc

francis.wall@utoronto.ca

Todd Cunningham, PhD

todd.cunningham@utoronto.ca



/Academicinterventionlab



@Atselect_oise



@Atselect_oise



www.ATSELECT.org



www.ACADEMICINTERVENTIONLAB.com