# Writing Success

## WITH ASSISTIVE TECHNOLOGY FOR ALL STUDENTS

BY BRIDGETTE NICHOLSON

OCCUPATIONAL THERAPIST

ASSISTIVE TECHNOLOGY CONSULTANT

Supporting information at:
www.powerofatech.info

Slide and Accessible Text Outline Handouts at
www.powerofatech.info/2019miota

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## Today:

Collaboration and Discussion

Movement and Flexible Positions

Hands-On Tech!

'Old-fashioned survey'

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## Why is writing so important?

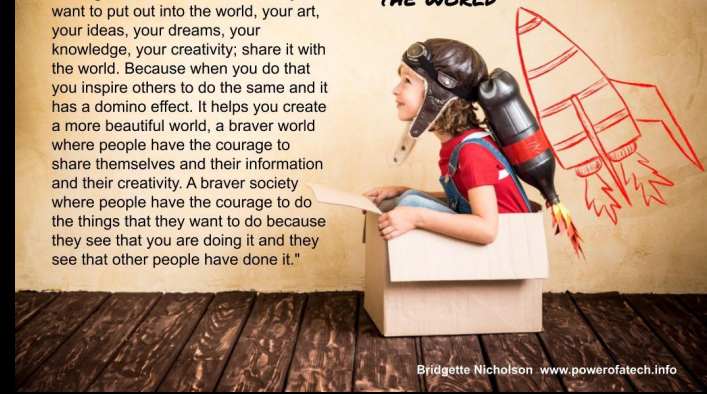## Importance of our approach and plan for teaching and supporting writing

- Confident
- Brave
- Participation
- Making
- Building
- Contributing

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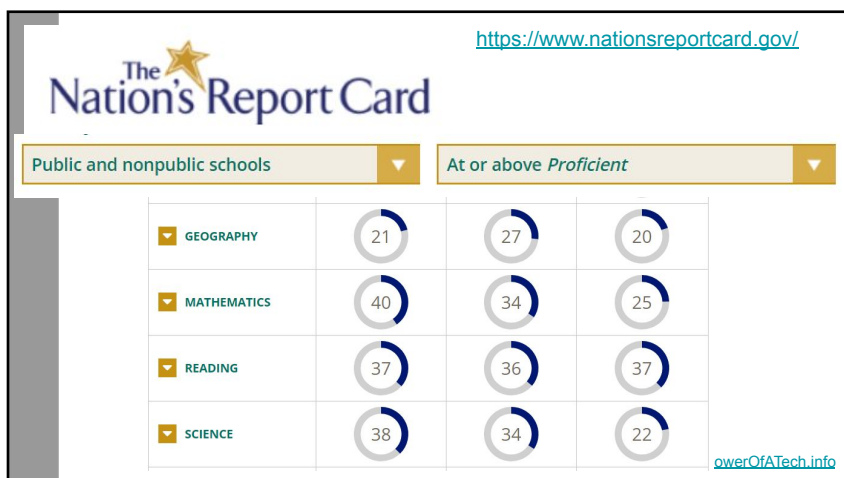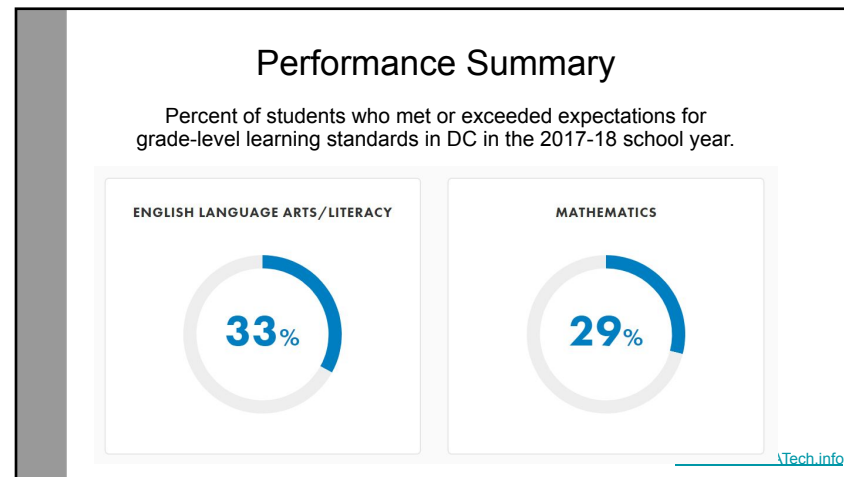
## Share your ideas with the world

"Albert Einstein said Creativity is Contagious. Pass it on. Whatever you want to put out into the world, your art, your ideas, your dreams, your knowledge, your creativity; share it with the world. Because when you do that you inspire others to do the same and it has a domino effect. It helps you create a more beautiful world, a braver world where people have the courage to share themselves and their information and their creativity. A braver society where people have the courage to do the things that they want to do because they see that you are doing it and they see that other people have done it."

Bridgette Nicholson  www.powerofatech.info

**Slide 1:**

https://www.nationsreportcard.gov/

The Nation's Report Card

Public and nonpublic schools | At or above *Proficient*

GRADE 8 | WRITING | 2007

ACHIEVEMENT LEVELS - at or above *Proficient*

2007 National public (NP) percentage at or above *Proficient*

NP 31%

In the US, Over 2/3 of our students demonstrate significant challenges with writing!

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**Slide 2:**

## Performance Summary

Percent of students who met or exceeded expectations for grade-level learning standards in DC in the 2017-18 school year.

ENGLISH LANGUAGE ARTS/LITERACY

33%

MATHEMATICS

29%

\Tech.info

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**Slide 3:**

https://www.nationsreportcard.gov/

The Nation's Report Card

Public and nonpublic schools | At or above *Proficient*

| | | | |
|---|---|---|---|
| GEOGRAPHY | 21 | 27 | 20 |
| MATHEMATICS | 40 | 34 | 25 |
| READING | 37 | 36 | 37 |
| SCIENCE | 38 | 34 | 22 |

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**Slide 4:**

# Assistive Technology can, and DOES have significant, positive impact.

## The research and the data shows it.

NATE NETWORK - Connecting Assistive Technology Specialists in Education

Assistive Technology Research Summary  (002)

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## Slide 1

Research and Supporting Information

# https://www.powerofatech.info/links

### Supporting Information and References for Presentations

*By Bridgette Nicholson, Occupational Therapist/Assistive Technology Consultant*

www.powerofatech.info/links

| 001 | Supported eText: Effects of Text-to-Speech on Access and Achievement for High School Students with Disabilities. 2009; Izzo, M.V., Yurick, A. & McArrell, B.; Journal of Special Education Technology; Vol.24, Issue 3; | |
| 002 | NATE NETWORK - Connecting Assistive Technology Specialists in Education Assistive Technology Research Summary https://www.natenetwork.org/resources/ | |
| 003 | NAEP assessments https://www.nationsreportcard.gov/ | |
| 004 | Overview of Assistive Technology Research https://www.natenetwork.org/resources/ | |
| 005 | Handwriting Movement Sonification for the Rehabilitation of Dysgraphia https://www.sciencedaily.com/releases/2011/01/110119095458.htm | |

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## Slide 2

Please go to this webpage for hands-on:



*BY BRIDGETTE NICHOLSON*

*OCCUPATIONAL THERAPIST*

*ASSISTIVE TECHNOLOGY CONSULTANT*

Supporting information at:
www.powerofatech.info

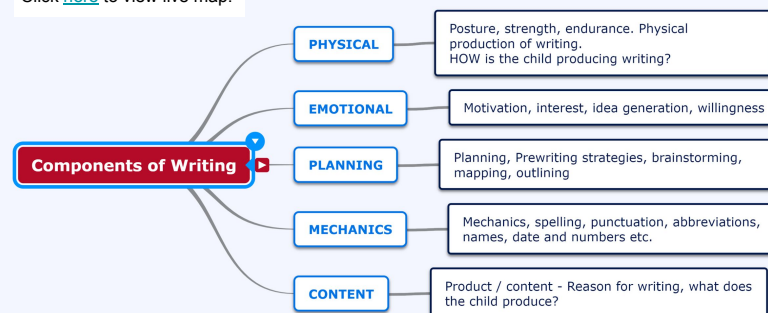*Slide and Accessible Text Outline Handouts at*

*www.powerofatech.info/2019azota*

## Slide 3

AzOTA Session Brainstorming & Collaboration

**Role play student writing**

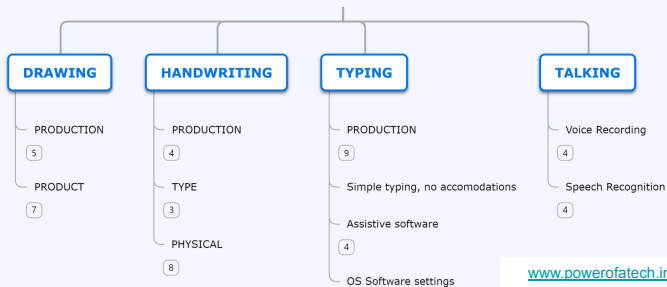- Brainstorm
- Mapping
- Quick think
- Voice Recording

**Important stuff**

Silly  Fun  Serious

## Slide 4

Click here to view live map.

**Components of Writing**

- **PHYSICAL** — Posture, strength, endurance. Physical production of writing. HOW is the child producing writing?
- **EMOTIONAL** — Motivation, interest, idea generation, willingness
- **PLANNING** — Planning, Prewriting strategies, brainstorming, mapping, outlining
- **MECHANICS** — Mechanics, spelling, punctuation, abbreviations, names, date and numbers etc.
- **CONTENT** — Product / content - Reason for writing, what does the child produce?

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## Slide 1

# WRITING

*How do kids....*

**SHOW WHAT THEY KNOW**

Click [here](#) to view examples of programs and strategies for each of these writing methods

| **DRAWING** | **HANDWRITING** | **TYPING** | **TALKING** |
|---|---|---|---|
| PRODUCTION `5` | PRODUCTION `4` | PRODUCTION `9` | Voice Recording `4` |
| PRODUCT `7` | TYPE `3` | Simple typing, no accomodations | Speech Recognition `4` |
|  | PHYSICAL `8` | Assistive software `4` |  |
|  |  | OS Software settings |  |

www.powerofatech.info/database-writing

## Slide 2

# Writing Success: FOR ALL STUDENTS.

WRITING PRODUCTION

Handwriting

Typing

Voice Recording

Speech Recognition

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## Slide 3

# Writing Success: FOR ALL STUDENTS.

SPEECH

AAC device user

Emergent Verbal skills

Intelligible Speech

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## Slide 4

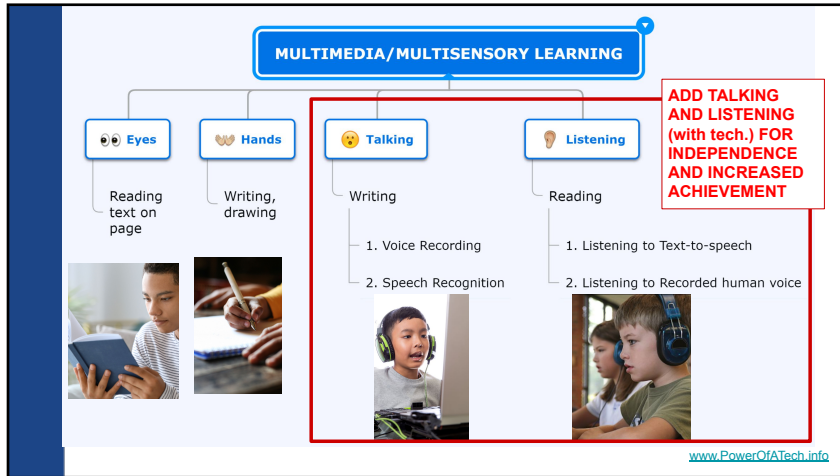**MULTIMEDIA/MULTISENSORY LEARNING**

| 👀 Eyes | 🤲 Hands | 😮 Talking | 💡 Listening |
|---|---|---|---|
| Reading text on page | Writing, drawing | Writing | Reading |
|  |  | 1. Voice Recording | 1. Listening to Text-to-speech |
|  |  | 2. Speech Recognition | 2. Listening to Recorded human voice |
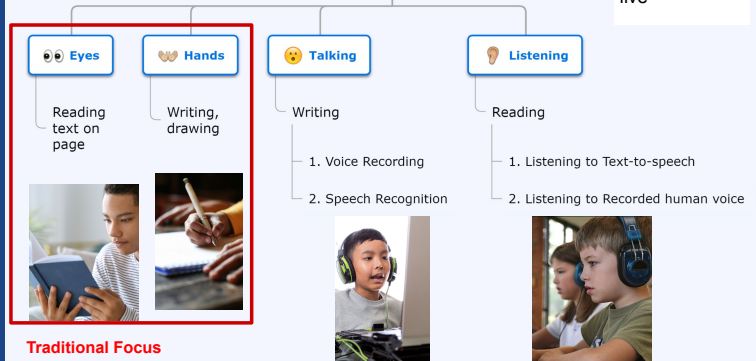
**Traditional Focus**

www.PowerOfATech.info
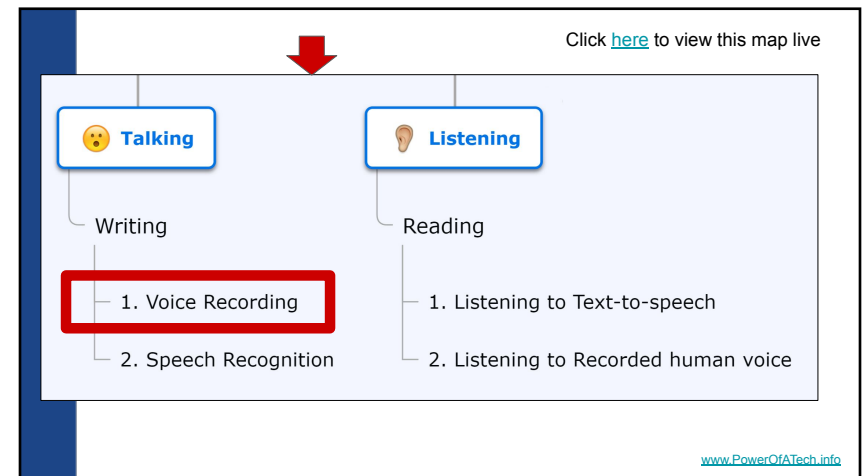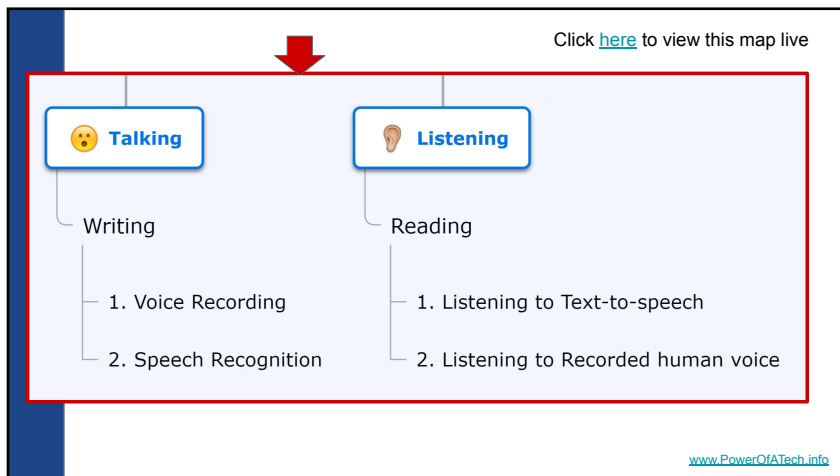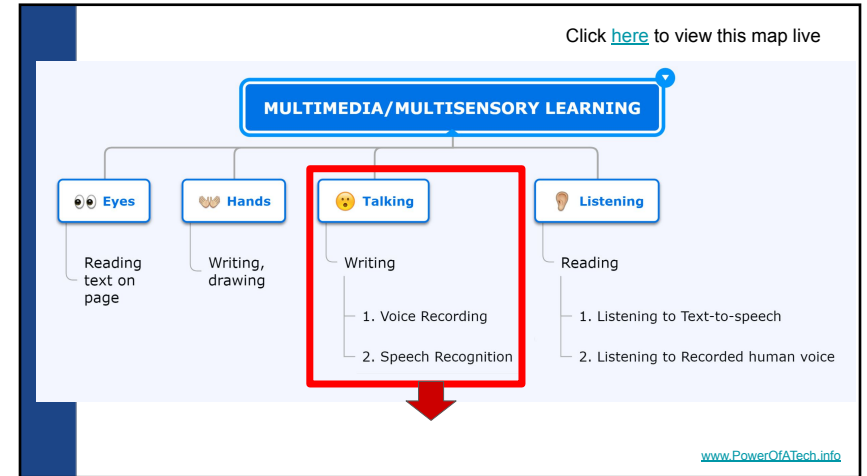
'INDEPENDENT' SPEECH AND HEARING USING TECHNOLOGY ARE THE MOST UNDERUTILIZED SKILLS IN LEARNING

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YET, SPEECH AND HEARING (WITH TECH.) ARE MANY OF OUR STUDENTS BEST 'RELATIVE' STRENGTHS!

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AzOTA Session Brainstorming & Collaboration

Role play student writing
- Brainstorm
- Mapping
- Quick think
- Voice Recording

Important stuff
Silly   Fun   Serious

QBall throwable microphone
- Hands on activity
- Role play student
- Voice Recording

QBall throwable microphone

www.powerofatech.info

1. Voice Recording



Dictating to adult:
- Increases dependence
- Reduces creativity
- NOT independent thought and work!

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## Slide 1

### Voice    Speech    Talking

ALL kids of all cognitive
and grade levels

Think about YOUR students
  Skill areas
  Relative strengths

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## Slide 2

### Creativity    Storytelling    Confidence

From a young age kids love talking
and telling stories:
  Intuitive
  Expansive
  Confident
  Fun
  Production of information
  with NO mechanics

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## Slide 3

### Speech IN / Talking / Voice Recording

Voice only, no text

A powerful means for students to produce independent
work!

Use of voice for writing and documenting thoughts, ideas,
information

Dictating to an assistant / teacher / parent

Dictating to a computer / voice recorder / other
technology

Independence and achievement vs. dependence and
assisted work

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## Slide 4

### Who can or should use Voice Recording?

Students with:

- Intelligible and those with speech challenges
- Many thoughts, ideas and information
- Poor handwriting or typing
- Poor spelling
- Poor motivation for writing
- Non verbal students using AAC devices
- Any student who needs to brainstorm or quickly record
  information

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## Benefits of using Voice Recording for Writing

**Using student's relative strength!**

For ALL verbal students AND nonverbal students using AAC devices,

regardless of cognitive level.

Reduced mechanics, increased efficiency

Quality of speech NOT important

Quality of content increases

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## Stages of Training for Voice Recording

Need strategies and carefully planned introduction and training

Using a microphone and voice recording is not automatic success

Can be highly successful with the right training

OR can be negative/not as successful

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## Stages of Training for Voice Recording

1. Voice play
2. Voice email and voice chatting
3. Basic dictation into documents
4. Voice annotation
5. Mapping with voice
6. Stand-alone voice files
7. Dictating longer answers / papers
8. Hand-held recording
9. Audio editing
10. Podcasting

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😮 **Talking**          👂 **Listening**

Writing                    Reading

— 1. Voice Recording       — 1. Listening to Text-to-speech

— 2. Speech Recognition    — 2. Listening to Recorded human voice

## Slide 1
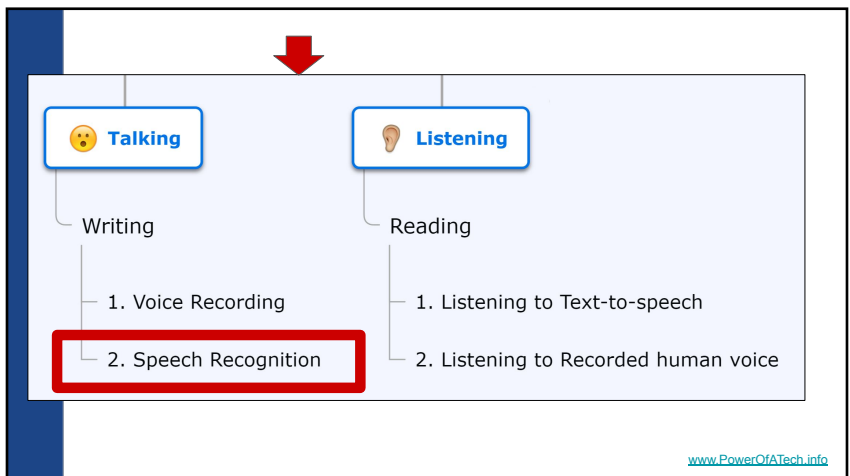
# 2. Speech Recognition

Speech to Text Technology - massive improvement

More potential for greater numbers of students now

## Slide 2

Speech-to-Text Technology
**SIGNIFICANT IMPROVEMENTS**
   Greater Accuracy
   Lower Cost or Free
   Available on many platforms
(hardware and software)

Speech Recognition, with the right approach and training, has great potential to improve students writing.

Exciting options with new speech integration into regular technology all around us!

## Slide 3
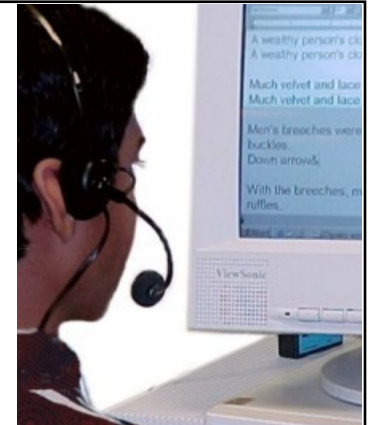
- More complex than voice recording:
  - Accuracy of dictation
  - Only for students with 'adequate' articulation
  - 'Adequate articulation' hard to quantify
  - More complex cognitive task
    (writing process, reading, editing)

- Overall more complex BUT great benefit for some students

- PLANNED AND STRUCTURED APPROACH TO TRAINING IS ESSENTIAL

**Speech Recognition cannot and should not be 'plug-n-play'.**

**Need planning and training for greatest success.**

## Slide 4

TRAINING APPROACH and STEPS for SPEECH RECOGNITION (SR)

   Before speech recognition, start with voice recording, it's

a. motivating
b. easy
c. conversational
d. a GREAT precursor for skill development prior to SR
e. many other benefits…

## Slide 1

Student Case Studies and Work Samples

Student #1

3rd grade

## Slide 2

Student #1



I think Minecraft is fun. Another thing that I think is fun is playing in the snow. I also think the Wii is fun.

I think Minecraft is fun. Anothe is playing in the snow. I also f

Handwriting = 6.3 words per minute

## Slide 3

Student #1

TYPING - regular keyboard

"I really like recess here. Another thing that I really like is playing in the snow. I also like playing the Wii."

Typing = 5.3 words per minute

## Slide 4

Student #1

*VOICE RECORDING - transcribed by adult after recording*

I also play Minecraft on the computer. I've never, I've never...When I played it, a lot of times, every time when I played it, I didn't see the Minecraft Creeper, and I went, and I burned up my lame house, and I went into it one time and I got stuck in it. My house in Minecraft, I burned up. I burned it up because it was lame. Because it was a lame house. That's all's I remember that I play. …on the computer.

I play in the snow. I pretend that the snow and ice are gold.
I pretend that they are gold. I also make snow angels. That's alls I do in the snow. I go down the…I do it in Royal Oak Park.
I have one brother, I don't have any sisters.
I play the Wii. I play Wii Sports Resort. I also play Super Mario Galaxy II Wii. At first, I didn't play because at first I didn't really want to play as a Star in Super Mario Wii.
And, in Super Mario Galaxy, Wii's a star that Player 2 has to play as, is in a bubble all the time, and it can, and that Star can spin. And that car can, and that star can spin.
Cause all the characters in Super Mario Wii get to spin, and in that, and that, in Super Mario Galaxy II Wii, you have to, the Player 2 has to play as a Star.
Nope, it doesn't do, nope, it doesn't do anything special.
 I don't know if there are more fun things or not.

One time, he was recording his voice for a project.
My brother. I might eventually have to do that for my project. Because he did that in school, so I probably will do that.

Listen to student's voice writing

## Slide 1

Student Case Studies and Work Samples

# Student #2

# 10th grade

## Slide 2

Student #2

**The grat wall of China was bilt by the emper Cin. The wall was to protick the china pepar**
**From the Mogole invaters the best hous back army that ever existed. The grat Wall of china tuck bilyens of lives to belled and miluns war killed.**

Typing = 9 words per minute

## Slide 3

Student #2

[Listen to student's voice writing]

*(Student recorded this information with no support or prewriting strategies, transcribed by teacher after recording)*

**The Great Wall of China was built to protect the Chinese from the Mongol invasions during the Ching dynasty. The wall stretches from the Northeast coast of China 2000 miles to the Southwest coast. The wall took billions of people to build but it cost over a million lives in deaths. The wall is built is a single wall that covers the whole fences of China. There was originally a series of smaller walls going all over China. The wall, 2000 years later, is falling apart because of erosion and neglection. The wall of China is an international symbol onfoods and company symbols. The Mongols are the greatest horseback riders that ever existed. The wall is not build right on the border of China but in of the border at least on the modern border.**

Voice Recording = 105 words per minute

## Slide 4

Student #2

*Dictated using speech recognition (15 minutes after initial voice enrollment) with assistance for corrections:*

**The Great Wall of China. It was built in the Ching Dynasty. The wall was built to protect the Chinese people from the Mongol invaders. The Great Wall of China took billions of people to build and millions died. The Great Wall of China took 14 years to build. The Great Wall of China 2000 years later is falling apart because the wall is being neglected and of tourists. A Great Wall of China was built from the north east coast to the southwest coast stretching 2000 miles. There was originally a series of walls. The Great Wall of China took 14 years to build the Mongol invaders were the greatest cavalry Army ever.**

Speech Recognition = 21 words per minute

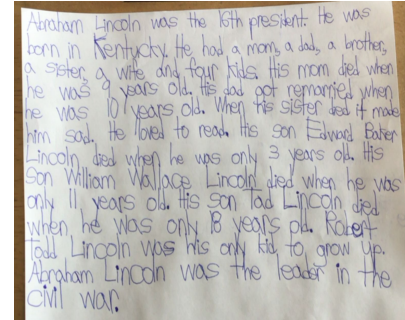## Slide 1

Student Case Studies and Work Samples

# Student #3

# 8th grade

## Slide 2

Student #3

**HANDWRITING**

Click here for larger image



9 min 24 sec

12.3 words per minute

## Slide 3

Student #3

**VOICE WRITING**



Listen to student's voice writing

Abraham Lincoln was the 16th president. He was born in Kentucky. He loved to read. He had a mom and dad, a brother and sister and four kids and a wife. When he was 9 years old his mom died. His dad got married when he was 10 years old. When his sister died it made him sad. His son Edward Baker Lincoln died when he was only three years old. His son William Wallace Lincoln died when he was only 11 years old. His son Tad Lincoln died when he was only 18 years old. Robert Todd Lincoln was his only son to grow up. Abraham Lincoln was the leader in the Civil War. He wrote the Gettysburg address and the Emancipation Proclamation. His height is 64. He was assassinated at Ford's theater by John Wilkes Booth. After the Civil War he died the next day at the Peterson house right across the street. He is buried in a cemetery called Lincoln's tomb with his family in Springfield. Abraham Lincoln was president for only four years.

2 min 36 sec

72.1wpm

## Slide 4

Student #3

**SPEECH RECOGNITION**

Abraham Lincoln was the 16th president. He was born in Kentucky. He loved to read. He had a mom, a dad, a wife, a brother, a sister and four kids. His mom died when he was nine years old. His dad got remarried when he was 10 years old. His son Edward Baker Lincoln died when he was only three years old. His son William Wallace Lincoln died when he was only 11 years old. His son Tad Lincoln died when he was only 18th years old. Robert Todd Lincoln was his only kid to grow up. Abraham Lincoln was the leader in the civil war. He was president for only four years. He wrote the Gettysburg address and the emancipation proclamation. The north liked him being president but the south hated him being president. He was assassinated by John Wilkes Booth at Ford's Theater after the Civil War. He died at Peterson house right across the street the next day. He is buried with his family in a cemetery called Lincoln Tomb in Springfield.

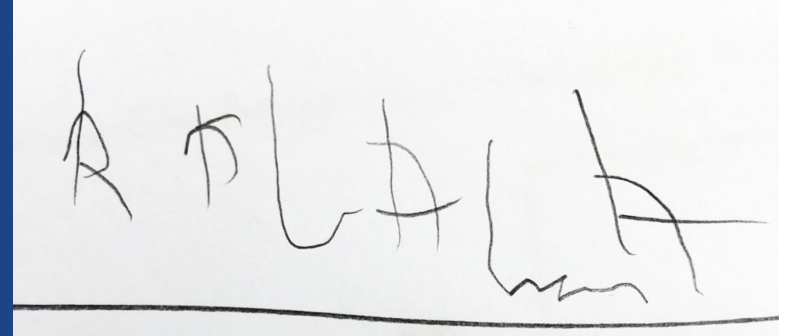9 min 05 sec

20.6wpm

**Student Case Studies and Work Samples**

Student #4

10th grade

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Student #4

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Student #4

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Student #4

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**Slide 4:**

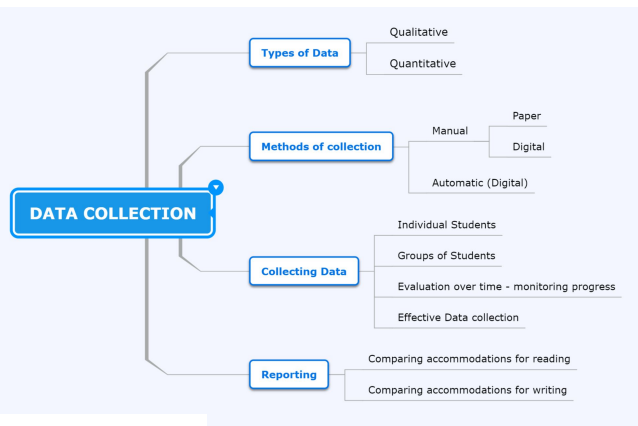# EVALUATION, TRAINING, DATA

**Evidence Based Practice**
**Data Driven Decisions**
**Student Data**

Systems for evaluating writing:
1. Variables
2. Production
3. Productivity
4. Content

**Slide 1 (top-left):** Mind map diagram

- **DATA COLLECTION**
  - **Types of Data**
    - Qualitative
    - Quantitative
  - **Methods of collection**
    - Manual
      - Paper
      - Digital
    - Automatic (Digital)
  - **Collecting Data**
    - Individual Students
    - Groups of Students
    - Evaluation over time - monitoring progress
    - Effective Data collection
  - **Reporting**
    - Comparing accommodations for reading
    - Comparing accommodations for writing

Click here to view this map live

**Slide 2 (top-right):**

- **Reporting**
  - Comparing accommodations for reading
  - Comparing accommodations for writing

**Slide 3 (bottom-left):**
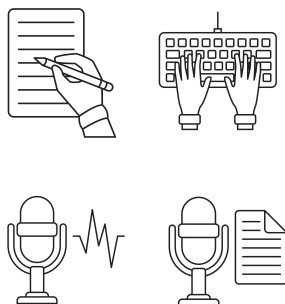
Comparing accommodations for writing

Collecting data for

Handwriting
Typing
→ Voice Recording
→ Speech Recognition

*Conference attendees will receive a subscription to this website to use with students. Please indicate it you want this on the feedback form at the end of the session.*

www.typingtraining.com

**Slide 4 (bottom-right):**

Evaluation of Writing - Production, Productivity, Content

www.typingtraining.com

**Method of Text Entry:**
*This is the method used to select a...*

- **Direct Select:**
  - ☑ 10 Finger Typing
  - ☐ Left Hand
  - ☐ Right Hand
  - ☐ Other

- **Directed Selection:**
  - ○ Mouse
  - ○ Joystick
  - ○ Switch Controlled Mouse Directions
  - ○ Other Mouse Control
  - ○ 2 Or More Switch Scanning
  - ○ Morse Code
- **Indirect Select:**
  - ○ Timed Scanning With Single Switch
- **Unspecified Text Entry Method**

*Conference attendees will receive a subscription to this website to use with students. Please indicate it you want this on the feedback form at the end of the session.*

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## Slide 1

Evaluation of Writing - Production, Productivity, Content

**Keyboard / Input Device Type:**

- (●) Standard QWERTY Keyboard
- ( ) Speech Recognition
- ( ) Handwriting Recognition
- ( ) Split, or Natural, Keyboard
- ( ) On-Screen Keyboard - QWERTY Layout
- ( ) On-Screen Keyboard - Frequency of Use Layout
- ( ) Big Keys - ABC Layout



- ( ) Big Keys - QWERTY Layout



- ( ) SimplyWorks Keyboard



- ( ) Small Keys Cherry Keyboard



- ( ) orbiTouch Keyless Keyboard



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## Slide 2

Evaluation of Writing - Production, Productivity, Content

www.typingtraining.com

**Other Hardware Used:**

- ☐ Wrist rest
- ☑ Height adjustable table
- ☑ Keyguard
- ☐ Arm support
- ☐ Adjustable Keyboard Mount or Tray (angle and/or height)
- ☐ Keycaps

Other Hardware Device(s):

[                                        ]

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## Slide 3

Evaluation of Writing - Production, Productivity, Content

www.typingtraining.com

**Software and Settings:**

- ☐ Sticky keys
- ☑ Filter keys
- ☑ Toggle keys
- ☐ Sound notification
- ☐ 800x600 resolution or lower (to enlarge screen items)
- ☐ Windows large scheme, including large font size
- ☐ Windows extra large scheme, including extra large font size
- ☐ Windows high contrast settings

Word prediction software: [                    ]

Abbreviation expansion: [                    ]
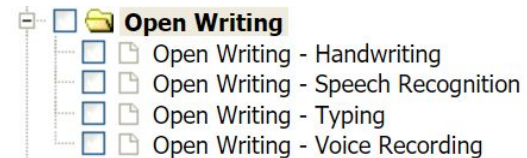
Browser Zoom / Text Size: (unspecified) ▼

Speech output software: [                    ]

☐ Speak Letter   ☐ Speak Word   ☐ Speak Sentence

Other Software and Settings: [                    ]

owerOfATech.info

## Slide 4

Comparing accommodations for writing

# Data collection for all 4 methods of writing WITH TEST SETUP variables

☐ 📁 **Open Writing**
- ☐ 📄 Open Writing - Handwriting
- ☐ 📄 Open Writing - Speech Recognition
- ☐ 📄 Open Writing - Typing
- ☐ 📄 Open Writing - Voice Recording

www.typingtraining.com

## Qualitative data

**Exercise Review and Grading**

Teacher grading
Work saved / recorded for teacher review and for data (including photos of written work / drawings, voice recordings)
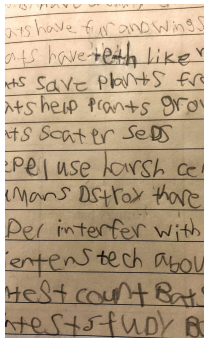
| Teacher Grade | Comments | Text Entered (errors highlighted) |
|---|---|---|
| None ✏ | ✏ | Elephants have gray skin, a long trunk, and 2 long tusks. They are herbivores, meaning that they don't eat meat. ✏ |
| | | 🖼 Show Image |

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## Quantitative

Speed
Accuracy
Numbers
and graphs



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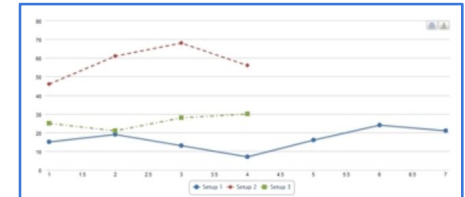
## Data collection for HANDWRITING



⏱ Start Timing    ✓ I'm Done

Click on the "Start Timing" button and start writing. If you have already completed the work, enter the time spent writing and then you can submit a photo of the work.

---

## Data collection for TYPING

SUMMER
During the summer I like

⏱                I'm Done

## Data collection for VOICE RECORDING

**Open Writing / Open Writing - Voice Recording**     User ID: fa

**Instructions:**

Talk about anything you want.

⏱      ⏸ Pause

✓ I'm Done

Recording...

---

Comparing accommodations for writing

## Data collection for SPEECH RECOGNITION

**Open Writing / Open Writing - Speech Recognition**

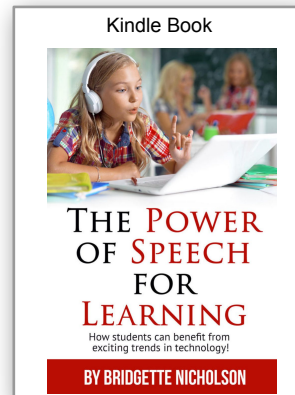**In this exercise you will use speech recognition. Writ**

Write about anything you want.

Click here and dictate your answer using speech recogni
Done".

I'm Done

---

# Resources

Kindle Book

If you want this resource, please indicate by checking the section in the survey you complete at the end of this session.

THE POWER OF SPEECH FOR LEARNING

How students can benefit from exciting trends in technology!

BY BRIDGETTE NICHOLSON

www.PowerOfATech.info

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# Resources

If you want this resource, please indicate by checking the section in the survey you complete at the end of this session.

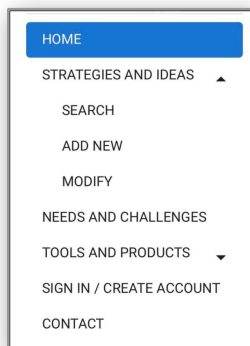Login for student evaluation and data collection for writing production methods

☐ 📁 **Open Writing**
   ☐ 📄 Open Writing - Handwriting
   ☐ 📄 Open Writing - Speech Recognition
   ☐ 📄 Open Writing - Typing
   ☐ 📄 Open Writing - Voice Recording
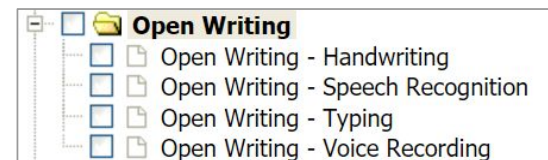
www.typingtraining.com

www.PowerOfATech.info

## Resources

A comprehensive database of

1. Assistive Technology TOOLS for writing (for ALL students of all ages, all cognitive levels and all functional levels)
2. STRATEGIES and REAL LIFE samples - information from people who are using the technologies, both students as well as their teachers and parents.
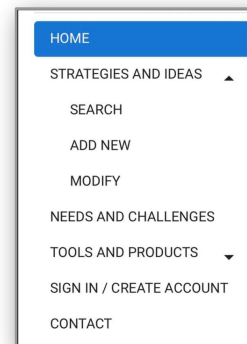
HOME
STRATEGIES AND IDEAS
   SEARCH
   ADD NEW
   MODIFY
NEEDS AND CHALLENGES
TOOLS AND PRODUCTS
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## Database

**PLEASE SHARE YOUR IDEAS AND KNOWLEDGE ON THE DATABASE**

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## Q & A
## Comments
## Suggestions?

THANK YOU!

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