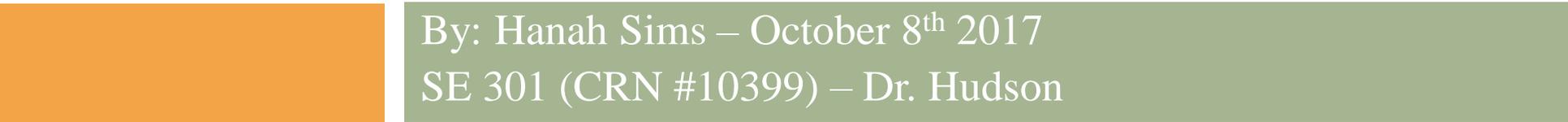




# Assistive Technologies: An Individual Case Study



By: Hanah Sims – October 8<sup>th</sup> 2017  
SE 301 (CRN #10399) – Dr. Hudson

# Scenario Information – Meet Drew

- Drew is a 12 year old student with severe Dyslexia as well as Dyscalculia and Dysgraphia.
- Although he struggles to read, write, and solve math problems, Drew has a strong vocabulary and the appropriate comprehension skills for his grade level.



# Specific Learning Disabilities

- Based on his diagnosed learning disabilities, Drew struggles with:
  - Reading & writing – his handwriting is often illegible and his spelling is inconsistent.
  - As a result, he often needs the assistance of a teacher's aide, and this causes Drew to:
    - Become anxious, self-conscious, resistant, and withdrawn.
    - Drew's anxiety causes him to miss school, which also leads to a steady decline in his academic performance.

# Drew's Learning Goals

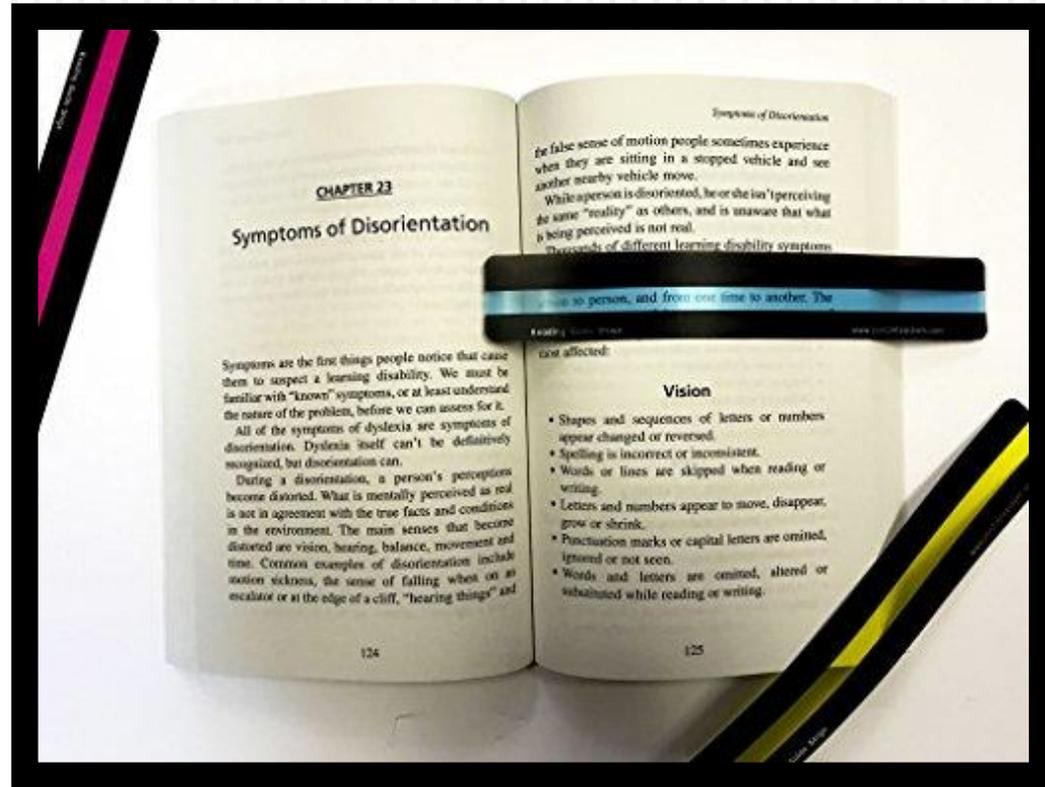
- By providing Drew with Low and High-Tech Assistive technology options for his unique learning disabilities, his learning goals will be focused towards:
  - ▣ Increasing his written output.
  - ▣ Increasing his spelling accuracy and the complexity of his writing.
  - ▣ Improving the legibility of his written work.
  - ▣ Completing his assignments independently.
  - ▣ And revising and editing his work with particular attention to his spelling, grammar, and descriptive details.



# Two Low-Tech Assistive Technology Options

# Option #1 – Reading Guides/Rulers

- Reading Guides are one low-tech option for Drew's Dyslexia.
- The guides, or rulers, would allow Drew to read information sentence by sentence at his own pace, which would aid in his word recognition, recall, reproduction, and spelling.



- Other product images available at: <http://astore.amazon.com/assistive-technology-20/images/B072J4P9YM>

# Option #2 – Graphic Organizers

- Another low-tech option for Drew's Dyslexia and Dysgraphia are graphic organizers.
- Graphic organizers would aid Drew in practicing his writing without requiring intense output, and they would also help him organize his thoughts prior to beginning longer written assignments.





# Two High-Tech Assistive Technology Options

# Option #1 – Voice Recognition Software

- A high-tech option for Drew's Dyslexia, Dysgraphia, and Dyscalculia includes Voice Recognition Software.
- Voice Recognition Software can allow users to input information verbally rather than struggle to write the same thoughts down on paper, no matter whether it includes terms, topics, or equations.



# Option #2 – Smart Pens

- Smart Pens are another high-tech assistive tech tool that allow users to handwritten information without missing material by recording lecture content which can be revisited later.
- Drew could use this tool to capture information without becoming anxious for missing verbal instructions, misspelling words, or confusing his letters.





# Assistive Technology Analysis

# Low-Tech #1 – Reading Guides

## **Reading Guides/ Rulers**

Cost: These guides are affordable learning tools—a single ruler can be purchased for approximately .70¢ or multipacks range from \$5-\$20 based on quantity, style, and colors.

---

Availability: Reading rulers are readily available online, and teachers can buy them in bulk based on their number of students.

---

Usage: Reading Rulers guide student reading by allowing them to read sentence-by-sentence while focusing on the words within the windowed or highlighted section.

---

# Pros & Cons of Reading Guides

## Pros

- Simple: Reading guides are a simple solution to help readers concentrate on words, memorization, spelling, sentence construction, and comprehension.
- Efficient: Reading rulers prevent students from skipping sections of readings or unfamiliar words.

## Cons

- Loss & Distraction: While they are made from relatively durable materials and affordable, two cons of these tools would be that they can be easily misplaced by students and used as toys rather than learning aids.

# Low-Tech #2 – Graphic Organizers

## Graphic Organizers

Cost: Graphic organizers are one of, if not, the cheapest low-tech option for teachers because they can be created for free in applications like MS Word, or they can be purchased and downloaded from websites like TeachersPayTeachers, at little to no cost—ranging from \$1.00 and up based on the various styles, bundles, subjects, and grade levels.

Availability: A graphic organizer is a widely available low-tech assistive technology tool that can generate hundreds of options with a single search. Graphic organizers can also be easily adjusted from one assignment to another with little effort.

Usage: Graphic organizers can be used either technologically or traditionally with all students no matter their performance levels to help them outline, brainstorm, create, and express ideas. An online graphic organizer and outlining software that could assist students with Dysgraphia and handwriting issues is Draft:Builder.

# Pros & Cons of Graphic Organizers

## Pros

- Organization: By using graphic organizers, students can organize their thoughts and writing ideas prior to beginning the paper/project.
- Universal Learning Tool: Graphic organizers are a simple accommodation that can assist with outlining, planning, reviewing, note-taking, and brainstorming in students with and without learning disabilities.
- Affordable: An easy solution for teachers to incorporate in the classroom without worrying about funding or budget cuts.

## Cons

- Paper Waste & Funding: They can use up quite a bit of paper and ink that may become an issue when funding is limited.
- No Guarantees: Although graphic organizers help jumpstart the writing process, this does not guarantee that students will improve in their written output or increase their descriptive details.
- Digital Accessibility Issues: If a teacher chooses to use a digitally based graphic organizer software, then they must also keep in mind that not all students have the same access to the technological resources needed to complete these assignments.

# High-Tech #1 – Voice Recognition Software

## Voice Recognition Software

Cost: Voice Recognition Software is available in free options as well as paid versions, which can range from \$100-\$500+ based on their sophistication and features. Free versions can be found in Apple and Windows products as well as within Google Docs, which translates speech into several other languages.

Availability: This type of assistive technology is widely available as long as users have access to the technology required to operate them. As voice recognizers can be downloaded through laptops/desktops and mobile apps, students using them will not feel as isolated as the technology is familiar and used by most people on a daily basis, such as Apple's Siri.

Usage: Voice Recognizers take verbal speech including rhythms, pitch, speed, and sound, and translates it into digitized samples that convert the letter fragments and phrases into typed text. Voice Recognition Software can be used for writing, editing, and solving problems, as some math software even allows users to dictate problems to assist students with Dyscalculia.

# Pros & Cons of Voice Rec. Software

## Pros

- Pacing: Students can begin writing their papers at the same pace as their classmates, even if they suffer from Dysgraphia—digital dictation takes the handwriting out of the writing process, but allows students to still experience and learn from the rewriting and editing process.
- Student Participation also increases by allowing them to use their strengths, such as verbal skills vs. written skills.

## Cons

- Noise Distraction for those not using Voice Recognition Software.
- Background Noise/Comments may be picked up through software and lead to mistyped words/phrases.
- Processing Mistakes: Speech Recognition Software is not 100% error free as certain words (they're, their, there) may not be transcribed correctly for the specific context.

# High-Tech #2 – Livescribe Smart Pens

## Smart Pens

Cost: Livescribe brand smart pens costs can range from approx. \$70-\$300 depending on the features and memory storage. In addition to the device, users must also purchase replacement ink as well as microdot paper that can cost anywhere from \$5-\$30 depending on styles and multipacks. If one does not mind loose sheets, microdot paper can also be printed from home.

Availability: Livescribe smart pens can be ordered online directly from the official Livescribe website along with the ink replacements, paper, and other accessories, or these smart pens can also be found on and offline at retailers like Walmart, Best Buy, Staples, and Office Depot.

Usage: Livescribe smart pens record lectures that correspond with your handwritten notes. As information is related, users press “record” on the smart pen, tap the same button located at the bottom of the Livescribe notebook paper, and then begin writing. After the lecture is completed and saved, the user can tap on their handwritten notes, which plays the corresponding feedback from the saved audio file in order for them to receive clarification on the selected item.

# Pros & Cons of Smart Pens

## Pros

- Reduces Anxiety: By capturing information, students who do not write as quickly or as neatly as others still have access to the information without feeling anxious that they missed something.
- Practice & Pacing: For students like Drew who have disabilities like Dyslexia and Dysgraphia, smart pens allow them to practice their penmanship and spelling, but not fall behind other classmates.
- Design: The designs of these products do not make those using those assistive devices feel as isolated as they might if using other cumbersome technologies.

## Cons

- Laziness: One con of using smart pens is that students who do not enjoy handwriting or do not see the importance of practicing it may create a habit of only recording lectures and not actually writing any notes.
- Background Noise: Similar to voice recognition software, smart pen recordings may pick up multiple speakers in a classroom or background noise.
- User-Friendly?: Memory limits and some technological expertise or support may also make it harder to use this technology for productive purposes.



# Selected Technologies Based on Individual Needs

# Low-Tech Selection – Graphic Organizers

- Graphic Organizers are one low-tech assistive technology that can help Drew accomplish his learning goals in a variety of ways.
- Graphic Organizers meet his unique needs and goals by:
  - Being universal learning tools – as these organizers are easy to incorporate within the curriculum, all of his general Ed. teachers could use them to help all of their students prep for assignments without isolating anyone with learning needs.
  - Increasing his written output and classroom participation - As he usually gets frustrated and withdrawn during writing time because he struggles to read and write, graphic organizers would help him focus on his written output without writing too extensively, ultimately improving his writing skills, and encouraging him to work on assignments independently without as much individualized help from his teachers or an aide.

# Graphic Organizers - Explanation for Implementation Cont'd

- Graphic Organizers also meet his unique needs and learning goals by:
  - Increasing the complexity and descriptive details in his writing: In outlining and brainstorming ideas using graphic organizers, Drew will have an organized foundation prior to beginning his paper, and then he can focus on adding descriptive details while also paying attention to his language, word choice, grammar, and punctuation.

# Why I Believe Graphic Organizers Satisfy This Scenario

- Overall, I believe by implementing a dually universal and low-tech assistive learning aid, specifically graphic organizers in this case, Drew will feel less self-conscious about his accommodations if all students are using the same assignment format.
- I also believe by allowing Drew to condense his information into an outline organizer, he will be more likely to participate during writing time, directly increasing his written output despite his Dysgraphia.
- Finally, graphic organizers satisfy this scenario by helping Drew prepare for lengthy written assignments independently and allow him to focus more of his attention on revisions and editing, including spelling issues, areas needing clarity, grammar, and punctuation.

# High-Tech Selection – Smart Pens

- Smart Pens are a high-tech assistive technology tool that can also meet Drew’s learning goals.
- By allowing Drew to use smart pens in his classes, this will help:
  - Increase his written output and improve his handwriting: In using a smart pen rather than voice recognition software, Drew is obtaining the content information and practicing his writing and spelling skills, which should help improve his spelling accuracy and the overall legibility of his handwriting.
  - Increase his classroom independence: Smart pens will enable Drew capture all instructions independently without relying on an aide or the teacher to explain any missed concepts.

# Smart Pens – Explanation for Implementation Cont'd

- By allowing Drew to use smart pens in his classes, this will help:
  - Reduce his anxiety about his learning disabilities: A smart pen would enable Drew to have some freedom and independence in completing his assignments, and it would not draw as much attention to his learning disabilities as other assistive technologies may, directly reducing his classroom anxiety.

# Why I Believe Smart Pens Satisfy This Scenario

- I believe smart pens satisfy Drew's scenario because they can assist him in any subject, and can capture any information he may be given; for example, Drew can even use a smart pen in his math class to capture his teacher's explanations and the steps to solving problems to help address his Dyscalculia.
- If Drew's written output and handwriting improvements are major learning goals, he will not meet these goals if he is given an assistive technology that does not require him to physically write; however, Drew can use smart pens to help him improve his penmanship and spelling mistakes associated with his Dyslexia and Dysgraphia.
- By allowing Drew to use smart pens inside the classroom for all subjects requiring any type of writing, I believe his overall academic performance will also improve by staying up-to-speed with his classmates.

# Summary & Conclusion

## Low-Tech Assistive Technology Options

Reading Guides

Graphic Organizers

## High-Tech Assistive Technology Options

Voice Recognition Software

Smart Pens

# Summary & Conclusions

## Drew's Case Study:

- Learning disabilities include: Dyslexia, Dysgraphia, & Dyscalculia.
- Learning goals include: increasing & improving written output, spelling, descriptions, and accuracy.

## Best Low-Tech Asst. Technology Option:

- Graphic Organizers
  - Increase written output.
  - Allow for greater attention to detail.
  - Can be easily modified for any subject or assignment.

## Best High-Tech Asst. Technology Option:

- Smart Pens
  - Capture information while student takes notes.
  - Allow student to practice penmanship without anxiety of missing information.
  - Increase written output.

# Works Cited

- Adebisi, R. O., Liman, N. A., & Longpoe, P. K. (2015). Using Assistive Technology in Teaching Children with Learning Disabilities in the 21st Century. *Journal Of Education And Practice*, 6(24), 14-20.
- Ahern, S. (2016). *THE LEARNING IMPACT OF SMART PENS ON STUDENTS WITH DISABILITIES*. Retrieved from <https://www.resna.org/sites/default/files/conference/2016/cac/ahern.html>
- Bouck, E. C., Meyer, N. K., Satsangi, R., Savage, M. N., & Hunley, M. (2015). Free Computer-Based Assistive Technology to Support Students with High-Incidence Disabilities in the Writing Process. *Preventing School Failure*, 59(2), 90-97.
- Bouck, E. C., Shurr, J. C., Tom, K., Jasper, A. D., Bassette, L., Miller, B., & Flanagan, S. M. (2012). Fix It with TAPE: Repurposing Technology to Be Assistive Technology for Students with High-Incidence Disabilities. *Preventing School Failure*, 56(2), 121-128.
- Cook, S. (2015). *Learning Abled Kids ASSISTIVE TECHNOLOGY FOR SPECIFIC LEARNING DISABILITIES WITH INFORMATION AND REVIEWS*. Retrieved from <http://learningabledkids.info/>

# Works Cited Cont'd

- Esposito, E. (2017). *The Beginner's Guide to Dictation Software: The Best Apps for Voice to Text Productivity*. Retrieved from <https://zapier.com/blog/best-text-dictation-software/>
- Kelly, K. (2017). *8 Tools for Kids With Dysgraphia*. Retrieved from <https://www.understood.org/en/learning-attention-issues/child-learning-disabilities/dysgraphia/8-tools-for-kids-with-dysgraphia#slide-5>
- National Center for Technology Innovation. (n.d.). Speech Recognition for Learning. Retrieved from <http://www.readingrockets.org/article/speech-recognition-learning>
- Neese, B. (2015). *5 Assistive Technology Tools That Are Making a Difference*. Retrieved from <https://online.alvernia.edu/5-assistive-technology-tools-that-are-making-a-difference/>