Assistive Technology and Research Handout

NANCI KING SHEPARDSON M.S.ED., ED.S., W.D.P.
@nkshep @wilsonlanguage

nshepardson@wilsonlanguage.com
508.368.1413
## Define Assistive Technology

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What tools will you Investigate when you get home?

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<th>“Wearables”</th>
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**SLIDE RESOURCES**

“When *carefully designed* and *thoughtfully applied*, technology can *accelerate, amplify,* and *expand* the impact of *effective teaching* practices. However, to be transformative, *educators need to have the knowledge and skills* to take full advantage of technology-rich learning environments. In addition, the roles of PK–12 classroom teachers and postsecondary instructors, librarians, families, and learners *all will need to shift* as technology enables new types of learning experiences.” (US DOE, 2017, p.12)

**Artificial Intelligence Tips:**
- Emphasize question words
- Importance of a “both-and” approach to books and multimedia
- Importance of being evaluative

**Virtual Reality:**
- Krokos, Plaisant & Varshney at the University of Maryland (2018) found virtual reality improves recall by 8.8%
- Executive Functioning skills: VR has a bigger impact in children under 7: “Children in the VR condition showed a significant *deficit in impulse-control skills*” (Aubrey, Robb, Bailey & Bailenson p.12).
- Reality vs. Fantasy Distinction: “Children *younger than 7* could face challenges *discerning* when virtual events are not real” (p.13).
- Children’s attachments to media characters in a VR environment could be used to *support learning and the development of prosocial behaviors*.” (p.14)
  - 2018 Report from Common Sense Media
  - VR and learning disabilities, Autism:  
  - Literature Review by Kalyvioti and Mikropoulos (2014) in reference section
  - AR and VR spending will increase from 17.8 billion in 2018 to 215 billion in 2021

**Wearables:**
- https://www.wearablex.com/pages/navigate
Notetaking:
Work of van der Meer and van der Weel (2017) “direct electrophysiological evidence that drawing by hand activates larger networks in the brain than typing on a keyboard.” (p.8)

Laptops
- Improved writing skills (Bagdasarov, Luo & Wu, 2017) with strongest impact on students with disabilities (Golberg, Russell & Cook, 2003)
- Teachers increase in best teaching practices (Harper & Milman, 2016)

Tablets:
- Work of Ifenthaler & Schweinbenz (2013) in comparison to computers: tablets offer greater mobility, usability and are less prone to software problems.

App Features (Neuman & Neuman, 2013)
- Age appropriate and linked to the school’s early literacy curriculum
- High level of interactivity to stimulate the senses
- Builds on and uses background knowledge
- Supports problem solving, higher order questioning, and creativity
- Clearly explains tasks to complete
- Provides peer collaboration opportunities
- Offers timely feedback
- Doesn’t create a feeling of success or failure, rather it guides the child
- https://commercialfreechildhood.org/

Literacy App Considerations:
- Cognitive: modeling, asking questions
- Affective: adult provides support to extend the learning
- Technical: help navigating the app (Neuman & Neuman)
- High quality apps do not just provide repeated practice
- Look for: specific phonological skills, explicit goals, and options for differentiation (Lisenbee, 2018)

Self-Instruction:
- “…occurs when a person uses instructional materials (e.g., written or picture task analyses, audio/video prompts) that “set the occasion” for target tasks without the use of an instructor (Shepley, 2017, p.60).”

- Be selective
- Provide a mission
- Pause to ponder (and write)
- Turn on closed captioning (https://www.edutopia.org/article/using-video-content-amplify-learning)
Digital Textbooks:
- Work of O’Bannon, Skolits & Lubke (2017) show general benefits are: accessibility, portability, convenience, interactive components, note taking, and the “surrogate instructor” (p.110) effect.
- Make sure the content is not above the student’s listening comprehension skills (Erickson, 2013).

CAI:
- CAI improves reading skills for all readers, including at-risk and ELL students (Schechter et al. 2015)
- Most effective when it is well coordinated with non-technological curriculum (Cheung & Slavin 2012)

Text-to-Speech:
- Work of Gandhi et al. (2017) shows read-aloud accommodations benefit struggling readers when question stems and answer options as well as the full text are read by the computer.
- Work of Gruner, Ostberg & Hedenius (2017) shows TTS improves reading rate and comprehension
- Students with reading disabilities feel less fatigue, have increased independence, and find it easier to finish assignments on time with the use of TTS (Bone & Bouck, 2016)
- According to Wood, Moxley, Tighe & Wagner, 2018, consider the following:
  - Rate
  - Type of Voice (Charlie Brown Effect)
  - Document tagging
  - Ability to highlight
  - Access to tech support
  - As a testing accommodation (Buzick & Stone, 2014)

Screen Reading vs. Paper Reading:
- Neuroscience, in fact, has revealed that humans use different parts of the brain when reading from a piece of paper or from a screen. So the more you read on screens, the more your mind shifts towards “non-linear” reading — a practice that involves things like skimming a screen or having your eyes dart around a web page.
- To keep the deep reading part of the brain alive and kicking, Zomorodi says that researchers like Wolf recommend setting aside some time each day to deep read on paper. (https://www.pri.org/stories/2014-09-18/your-paper-brain-and-your-kindle-brain-arent-same-thing)
- “…printed books make it easier to do dialogic reading, a highly effective strategy where an adult pauses while reading to ask questions that require thought and analysis. In addition, children’s needs vary. For instance, English language learners and children with below-average vocabulary levels tend to comprehend less with audio narration than when hearing a present adult read the story.” (https://www.kqed.org/mindshift/50781/hey-alexa-what-are-you-teaching-our-kids)
  - An e-ink tool is more “reader friendly” (Mangen, p.245, 2016)
  - Backlit screens can contribute to visual fatigue
  - Reader’s sense of text may be lessened: “narrative coherence” which impacts comprehension (p.161, Mangen and Kuiken, 2014)
  - What Gerlach & Buxmann (2011) call “haptic dissonance”
  - Screen reading can be less metacognitive (Jabr, 2013)
Blended Learning:
- The work of Banitt, Theis and Leeuwe (2013) showed the following increased:
  - Student engagement
  - Organization
  - Collaboration
  - Critical thinking
- Harper & Milman (2016) also showed positive changes in classroom environment

Ear vs. Eye Reading:

Sites to Explore:
- Letters Alive: https://alivestudiosco.com/
- http://www.quivervision.com/
- https://www.curiscope.com/products/virtuali-tee
- https://getrocketbook.com/
- https://myboogieboard.com/
- https://cpen.com
- https://squarepanda.com/
- 2 in 1: https://tinyurl.com/yavz6h45
- https://nearpod.com/
- https://www.play-lu.com/

Videos to watch:
- https://www.youtube.com/watch?v=jVm1qyUuXI0&feature=youtu.be
- https://www.youtube.com/watch?v=sa9HpWGDmMY

*Technology can provide struggling readers with application and practice opportunities but cannot replace a skilled teacher (Fisher & Ivey, 2006).*
References:


Milbourne, S. A. (2016, August). Assistive technology for young children – effective yet underutilized (or, is it undocumented)? Presented at ECIDEA, New Orleans, LA.


