Technology Preferences of Post-Secondary Students with Learning Disabilities

Sue Steinweg, Ph.D
Assistant Professor

East Carolina University
• The targeted audience for this session is composed of disability support services staff, college and university faculty, current and future middle and high school teachers, administrators, and other policy makers.
Reflect

Think back to when you went to college.

What were some of the changes you faced as you moved from being a high school student to being a college student?
Background

• Increased number of students with disabilities entering postsecondary schools
  – Up to 11% of undergraduate students have disabilities (Forrest, 2003; NCES, 2003, 2007)

• Experience challenges transitioning
  – Self-advocacy, self-determination, and social networking (Babbitt & White, 2002; Webb, Patterson, Syverund & Seabrooks-Blackbore, 2008)
  – Increased writing demands, anxiety with time tests, time management and organizational skills (Finn, 1998; Heiman & Percel, 2003)
Assistive Technology

• Becoming more accessible in post-secondary settings (Forrest, 2003)

• AT support available 51% of the time in postsecondary settings (Stodden, Roberts, Picklesimer, Jackson, & Chuan, 2006)

• Greater frequency of AT support at 2 year schools (Stodden et al.)
Barriers to Learning

• Printed class materials
• Lecture classes which require note taking
• Lengthy reading assignments
• Frequent and longer writing assignments
Assistive Technology

- Variety of assistive technologies are used in postsecondary settings
- Two example purposes
  - facilitate written language – word processing programs, spell checkers, outlining/brainstorming, speech recognition, screen readers, word prediction software
  - support students with reading difficulties – audio recorders, OCR systems, talking calculators
Training in AT Use

• Students need training in use of AT to reduce barriers (Christ, 2008).

• Experience with screen readers, voice-recognition software may be helpful for incoming students (Getzel, McManus, Briel, 2004).
Assistive technology is a recommended support for students with learning disabilities, but it only works if students use the technology.
Student Preference

• It is important to find out what technologies are viewed as effective and efficient supports by the college students who use them.
  – planning transition and for teacher training
  – matching AT to student strengths to prevent frustration and abandonment of AT
  – enabling high school teachers to make effective connections for students that can carry over to postsecondary settings
Ask the Students

• Asked 17 postsecondary students with learning disabilities identified during K-12
• Participated in program providing supports as they transition from high school and throughout university experience (Project STEPP)
• Interviewed in the program office which was a familiar and comfortable setting
Project STEPP’s Three-Tiered Model

**Tier 1**
Transition to ECU

- **Admissions**
  Alternate admissions criteria based on predictors of success for students with LD

- **Transition Resources & Support**
  Access to consultation and information on making a smooth adjustment to college

**Tier 2**
Continuing Supports

- **Residency**
  All first-year students live in one residence hall with easy access to campus supports

- **Support Network**
  Network of advisors, mentors, tutors, and other experts across ECU’s campus, in addition to cohort support

- **Coursework**
  Additional classes offering research-supported tools and strategies for college success

- **Direct Services**
  Including structured study hall, mentoring, tutoring, etc.

**Tier 3**
Graduation Transition

- **Internship**
  Supervised work experience in area of major for all students

- **Electronic Portfolio**
  Demonstration of competencies and achievements to aid in search for employment
Demographics

- 10 male and 7 female students
- Age range 18 to 22
- 13 freshmen, 3 sophomores, and 1 junior
- 11 lived on campus and 6 lived in apartments near campus
AT Experience of Students

- All had consistent access to on-campus AT Lab with wide variety of tools.
- AT Lab and Disability Support Department offered consultation and collaboration opportunities to help students find technology tools that matched their learning preferences and needs.
- Program loaned technology for evaluation.
Goals of Project

1. Determine AT supports used most frequently by postsecondary students with learning disabilities

2. Learn student perceptions about strengths and limitations of each tool
The project was designed to

- evaluate and strengthen resources available in the program office.
- help incoming students make informed choices about technology purchases.
Students Informed of Purpose

• Students were told the interview was not evaluative of their use of AT.
• Students were told their comments would be used to inform the support program, help prepare incoming freshmen, and provide feedback to professionals working with high school age students about considerations for AT availability and use.
Open-ended Interview Questions

Students were asked to

- reflect on different campus settings and the technologies they used in each one.
- provide a rationale for their technology choices.
- describe the strengths and limitations of technologies they used and those they chose not to use.
- share ideas for additional technology supports they would like to use in the future.
- suggest a technology bundle for incoming freshmen.
Campus Settings

Questions focused on 5 campus settings
1. Listening and participating in class lectures and discussions
2. Completing homework/assignments
3. Studying
4. Giving presentations
5. Participating in recreational or social activities
Technology

- Students were prompted by a list with photographs of technologies readily available on campus but asked to discuss any other technologies they had used.
- The list ranged from low-tech tools (e.g. pencil and paper) to high-tech tools (e.g. Kurzweil software).
## List of Technology

<table>
<thead>
<tr>
<th>Category</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pen/Paper</td>
<td>Livescribe Pulse Smartpen, Kurzweil Software</td>
</tr>
<tr>
<td>Reading Pens</td>
<td>Mobile Phone</td>
</tr>
<tr>
<td>Laptop Computers</td>
<td>Tablet PC</td>
</tr>
<tr>
<td>Netbook</td>
<td></td>
</tr>
<tr>
<td>Dragon Naturally Speaking</td>
<td>PDA</td>
</tr>
<tr>
<td>Audio Recorders</td>
<td>Desktop Computer</td>
</tr>
<tr>
<td>Classmate</td>
<td>iPod</td>
</tr>
<tr>
<td></td>
<td>Digimemo</td>
</tr>
</tbody>
</table>
Technology Devices

- Pen & Paper
- Reading Pen
- Laptop Computer
- Netbook
- Dragon Naturally Speaking
- Audio Recorder
- Classmate
- Digimemo

East Carolina University
Technology Devices (cont.)

- Livescribe Pulse Smartpen
- Kurzweil Software
- Mobile Phone
- Tablet PC
- PDA
- Desktop Computer
- iPod
Summary Findings

None of the students reported using
- PDAs
- Netbooks
- Desktop Computers
- Portable Reading Pens
- Livescribe Pulse Smartpen

100% of students reported using
- Pen/Paper
- Laptop Computers
- Mobile Phones
Summary Finding

88% Mobile Phones (frequent use)
56% Tablet PCs
53% iPods
47% Audio Recorders
35% Kurzweil
18% Classmate
  6% Digimemo
  6% Dragon Naturally Speaking
Pen and Paper

Strengths: Portable; familiar to students; no need to “plug it in;” hard copy product; can draw diagrams/symbols; helps focus in class; efficient when studying

Limitations: Spelling and legible handwriting are important; hard to write “quickly enough” in class; not “professional” in appearance for work to be submitted to instructors
Laptop Computers

Strengths: Expanded options for taking notes (e.g. writing on PowerPoints); helpful for completing assignments; necessary for online research; spell-check and thesaurus features; word processing capabilities – documents professional in appearance; useful when studying if course materials are posted online; useful when presenting; available associated AT resources – social networking capabilities such as FaceBook, email, videoconferencing, instant messaging; helpful for staying connected with family and friends
Limitations: Potential for distraction in class and when studying, problems when typing speed is slow; some symbols needed for work or notetaking not standard on keyboard; some instructors require submission of hard copies of notes; extra weight to carry around on campus; technology learning curve for some
Mobile Phones

Strengths: Helpful for scheduling & reminders; can touch base with friends, family, and classmates; versatility with text messaging and calling options; can use to “get out of awkward situations”

Limitations: Potential distractions; limited face-to-face contact; expectation for 24-hour accessibility; temptation to use phones/texting in class – negative perception by instructors
Major Limitations of Other Technologies

• Audio Recorders – Difficulty locating desired part of lecture; batteries
• Kurzweil – Linked to computer; standard voices not appealing; difficult to skim text
• Dragon Naturally Speaking – Time consuming to “train”
• iPods – Short battery life; potential distractions
• Tablet PC – weight
• Digimemo – limited features
• Livescribe – keeping charged
Themes and Patterns

• Throughout the interviews a common theme was using the tools with which they were comfortable (i.e. Pen/paper, Mobile Phone, Laptop).
• Students chose to use technologies commonly used by other students.
• An interesting pattern in the interview responses revealed that the students who were willing to try the use of AT in the university setting were the same students who had used AT with some frequency in high school.
• Students with limited use of AT for academic purposes in high school were seldom willing to experiment with “one more thing” to learn.
Finding ways to meaningfully incorporate technology in high school programs may be one way to increase student comfort with using technology in postsecondary settings.
Recommended Technology Bundle

- Laptop Computer
- Mobile Phone
- Pen/paper
- iPod

This recommended bundle represents fairly standard college tools.
What Would Like to Try?

29% expressed an interest in trying the Livescribe Pulse Smartpen that had been demonstrated in one of their classes.

This led to the follow up interviews one semester after the program purchased Livescribe Pulse Smartpens.
What is a Livescribe Pulse Smartpen

- Looks like a fountain pen
- Captures auditory lecture data
- Pairs the audio with the handwritten notes
- Allows access to auditory data in a non-linear way by tapping on the notes
Livescribe Pulse Smartpen

www.livescribe.com

East Carolina University
Features

• Livescribe dot paper in notebooks
  – Microdots - must look closely to see the dots
• Pen with camera and microphone
• Take photos of position on paper and links it to the recorded audio
• Tap on the notes and hear the audio from that point
DOT POSITIONING SYSTEM
Microdots printed on Livescribe dot paper enable the infrared camera at the tip of the Pulse smartpen to track everything you write down.

Special Controls at the bottom of each page help you navigate pen applications and features.

Print Your Own Dot Paper

Now, you can print your own dot paper for free from your Livescribe Desktop.

In just a few simple steps, you'll be able to print your own dotted notepads on sheets of regular printer paper, using currently available color printers with 600 dpi resolution or better.

The pages you print will work with your Pulse smartpen in exactly the same way as any other sheet of Livescribe dot paper. You'll be able to record audio and link it to what you are writing, tap your notes to play back what you recorded, and then transfer it, store it, and play it back in the Livescribe Desktop from your computer.

For more details, click here.
Student Use of Livescribe Pens

• Based upon students’ comments in our initial interviews, Livescribe Pulse Smartpens were purchased by the STEPP Project.

• Students had two semesters to try the Livescribe in a variety of settings.
Interview Group

- 15 students in the STEPP Project
- 7 first-year, 4 second-year, 3 third-year, and 1 fourth-year students
- Ages 18-22
- Consistent access to borrow the Livescribe Pulse Smartpen
Goals

- To identify examples of potential Livescribe uses
- To highlight strengths and limitations of the device
- To identify note taking strategies and techniques used by the students
Interview

• Students were asked to provide the following:
  – Examples of situations in which they had chosen to use the Livescribe
  – Perceived strengths and limitations of the device based upon their experiences
  – Note taking strategies and note review techniques employed when using the Livescribe
Interview

• Not intended to provide evaluation of the use or effectiveness of the Livescribe
• Goal was to learn students’ perceptions of the tool
• Inform future students coming to campus
Themes in Student Comments

• Use of the Livescribe when receiving information
• Use of the Livescribe when studying and working with information
• Strengths of the Livescribe
• Perceived limitations
Use When Receiving Information

- Capturing information in lecture classes
- Capturing detailed explanation about math problems solved in class
- Taking notes during a meeting
- Recording spoken comments when interviewing
- Usually also took notes with the audio capture
- Developed a system to indicate when information was missing
Use When Reviewing Information

• Some reviewed notes after class; looked for marks indicating missing information and added
• Some listened to notes after class tapping on written problem to hear the teacher describe a math problem
• Some re-listened to lectures to expand their notes
• Some just used as a back-up and rarely reviewed
Strengths

- Linking of voice files to handwritten comments
- Being able to locate information without scrolling through
- Revisiting previous lectures in a non-linear manner
- Purchasing notebooks at reasonable cost
- Holding notes from across the semester
- Inconspicuous
Limitations

- Making time to learn
- Remembering to charge the battery in the pen
- Does not work on handouts not printed on dot paper
- May tempt student to take less notes
Why Use the Livescribe

• Addresses challenges with notetaking
• Does not look different from what others use in class – pen/spiral notebook
• Student increases independence and does not have to rely on a notetaker
Summary and Future

The interviews were designed to
- evaluate and strengthen resources available in the program office.
- help incoming students make informed choices about technology purchase and use.

• Future project – providing AT to high school students accepted for the STEPP project
  – Questioning them about use
  – Gathering data on their use of AT in university
Questions or ideas to share?
Thanks for coming!

Sue Byrd Steinweg
steinwegs@ecu.edu
References