Closing the Technology Gap:

Incoming Freshmen with LD/ADHD Need More than Just a Laptop

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"To succeed in today's information-based economy, students need to know how to use technology to create and transform information."

-Kurt Landgraf (2003)
President, ETS

Snapshot of College Students with Disabilities

- *LD (113)*
- *ADD/ADHD (75)*
- *Psychiatric (40)*
- *Health conditions (36)*
- *Mobility-related (24)*
- *Deafness/HOH (13)*
- *VI/Blindness (11)*
- *TBI (7)*
- *MR/DD (6)*
- *Speech and Language (5)*
- *Autism (4)*
- *Deaf/Blindness (2)*

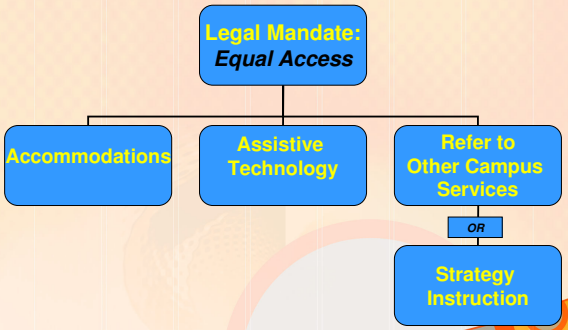
- (Harbour, 2004)

Growth Trends:

College students with LD triple in number
- 1978 – 3% of college freshmen self-reported
- 1998 – 9% of college freshmen self-reported

Growth in disability services at the college level
- 1981 – 9 "LD" programs
- 1991 – 1,000 DSS programs
- 2001 – 2,100 AHEAD members in 14 countries

Traditional Model of DSS



Need for an Updated Model

- Today's college students are expected to possess more than just a basic level of technological competencies.

  - Allen & Seaman (2005)

- "Freshman are arriving on campus with better technologies than their colleges have to offer."

  - Chronicle of Higher Education (September 22, 2006)

- Internet use among college age students is high: 18 - 29 years (88%); 30 - 49 years (84%)

  http://www.pewinternet.org/PPF/r/163/report_display.asp

Need for an Updated Model

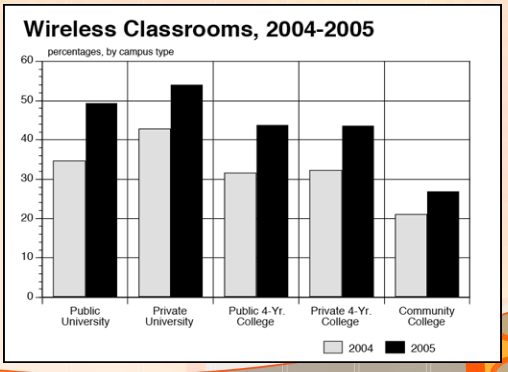
- Many postsecondary campuses have technology competency expectations at the institutional and department level:

  Cal Poly Pomona
  http://www.csupomona.edu/%7Elibrary/InfoComp/instrument.htm
  University of Arizona
  http://www.dizzy.library.arizona.edu/library/teams/infolit2000/infolit.shtml

- National Higher Education Initiative, ETS, and several colleges are piloting a **new ICT Literacy Assessment** for students transitioning from high school to college.

  http://www.ets.org/ictliteracy

Need for an Updated Model



Need for an Updated Model

- **UConn's Computer Technology Competency**:

Entry Expectations – Students should demonstrate a basic understanding of and competency in computer technology in the following eight areas:

1. **Computer Operation Basics**
2. **Word Processing**
3. **Presentation Software**
4. **Spreadsheets**
5. **Databases**
6. **Graphics and Multimedia**
7. **Internet/Web Basics**
8. **Electronic Communications**

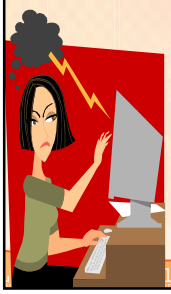
http://geoc.uconn.edu/geocguidelines.htm

Need for an Updated Model

- Students with LD/ADHD experience difficulties with procedural knowledge and providing metacognitive self-prompts that could allow technology to "off load" demands on their cognitive abilities.
  - Englert, Wu, & Zhao (2005); Fichten, Asuncian, Barile, Fossey, & Robillard (2001)
- Self-regulation is a critical skill for successful learning in online environments, but students with LD/ADHD are often impaired in self-regulatory behaviors.
  - Mull & Sitlington (2003); Ruban, McCoach, McGuire, & Reis (2003); Willis, Tucker, & Gunn (2003)
- An overemphasis on assistive technology (K-12) may distract from developing familiarity with the strategic use of "mainstream" technologies.
  - Anderson-Inman, Knox-Quinn, & Szymanski (1999); Day & Edwards (1996)

Need for an Updated Model

- **Transition questions from "the trenches":**



Do freshmen with LD/ADHD possess learning technology competencies to the same extent as their peers without disabilities?

If not, who has the skills to help them develop these critical competencies?

When do busy college students with cognitive disabilities have time for this "extra" curriculum, anyway?

Need for Data

- **Research questions:**

(1) Is there is a statistically significant difference in the ***level of comfort and preference*** for learning technologies among college students with and without LD/ADHD?

(2) Is there is a statistically significant difference in ***fluency with core and supplementary tech competencies*** among college students with and without LD/ADHD?

(3) Can ***student characteristics*** predict the acquisition of technological competencies?

Tech Survey - Demographics

	LD/ADHD	*No Disability*
Sample	*44*	*98*
Gender	*Males - 18* *Females - 26*	*Males – 15* *Females - 73*
Average age	*22 years*	*20.5 years*
GPA	*2.93*	*3.6*
WebCT courses	*7*	*10*

Tech Survey – Level of Comfort

Stated level of comfort	Mean LD/ADHD	Mean No LD/ADHD	p-value
Taking an online course	*X(D) = 2.65*	*X(ND) = 2.40*	***0.27***
Communicating via email, discussion board, IM'ing	*X(D) = 2.0*	*X(ND) = 1.5*	***0.006****
Reading on screen for extended periods	*X(D) = 2.3*	*X(ND) = 2.5*	***0.544***

*** Students without disabilities were statistically significantly more comfortable with electronic communication compared to students with LD and/ ADHD.**

Tech Survey – Level of Comfort

Stated level of comfort	Mean LD/ADHD	Mean No LD/ADHD	p-value
Following written instructions on screen	*X = 2.1*	*X = 2.2*	***0.566***
Trying out new technologies	*X = 1.98*	*X = 2.39*	***0.031****
Online/computer based tests	*X = 2.43*	*X = 2.12*	***0.163***

*** Students with LD and/ ADHD were statistically significantly more comfortable with trying out new technologies compared to students without disabilities.**

Tech Survey – Level of Comfort

Stated level of comfort	Mean LD/ ADHD	Mean No LD/ ADHD	p-value
Using technology for activities other than coursework	X = 1.43	X = 1.14	***0.040****
Using WebCT or VISTA for coursework	X = 2.02	X = 1.62	***0.024****
Multi-tasking on the computer	X = 1.93	X = 1.35	***0.001****

*** Students without disabilities were statistically significantly more comfortable with non-academic uses of tech, WebCT course work, and multi-tasking on the computer compared to students with disabilities.**

A New Model Will…

- Recognize the "given" presence of technology in and out of today's college classroom.
- Integrate strategies instruction, learning technologies, and accommodations.
- View technology as a continuum of *choices*.
- Address the self-regulatory difficulties that limit proficiency with learning technologies.

LiTMS Model ©

Learning Task

Technology-based ADA accommodations (need based; requires documentation support)	Assistive technologies (preference based; access technologies)	"Mainstream" technologies (competencies required of *all* postsecondary students)
-audio books -calculator -computer for exams	-Inspiration (mapping) -Dragon Dictate (speech-to-text) -PDA and AlphaSmart -Adobe Acrobat -eReader (text-to-speech) -Flatbed scanner/OCR	-email protocol -electronic database searches -WebCT/VISTA (CMS) -desktop management of electronic data -Reading in open-ended (digital) environments

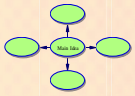
Learning Technologies Management Strategies (LiTMS)

> **Procedural strategies** (awareness, threshold knowledge)

> **Metacognitive strategies** (fluency, self-regulation)

LiTMS Modules

Inspiration

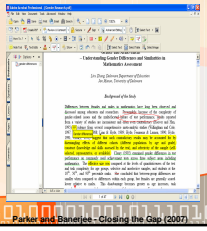


Dragon Dictate

Alpha Smart

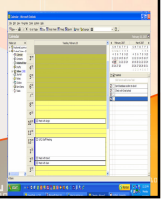
PowerDesk

Adobe Acrobat



CAST's eReader

Microsoft Outlook



Guiding Principles for Modules

1) *Begin with a "hook."*
2) *Focus on the task, not the technology.*
3) *Minimize reading; maximize visuals.*
4) *Walk through procedural steps.*
5) *Then help students customize the tech strategy with metacognitive considerations.*
6) *Provide "any time, anywhere" access.*

Other suggestions from your own experiences?

"Inspiration" Module (Hook)

Is Inspiration Right for You?

- ***Do you like to take notes while you are reading, but don't like to write note cards?***
- ***Do you learn better from a flow chart or diagram?***
- ***Do you usually start with an outline while writing a paper?***
- ***Do you like to have your notes and readings organized all in one place?***

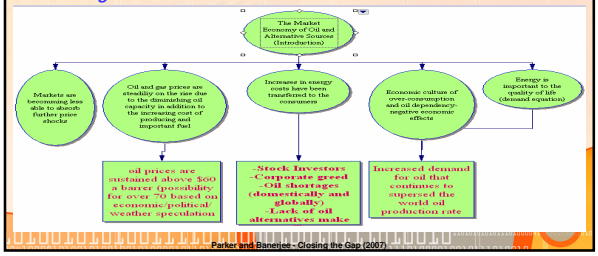
If you said Yes to any one of these questions, then Inspiration is the tool for you!

"Inspiration" Module (Task)

What Can You Do With Inspiration?

Inspiration is a software program that can help you organize information in a visual or outline form. It helps you see the "big picture" while studying. You can use Inspiration to:

- ***Make visual displays (diagrams, flow charts, concept maps) of your readings and notes.***



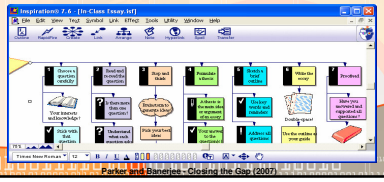
"Inspiration" Module (Procedural)

Step 1. Getting started

- ***Go to desktop and click on Inspiration icon to get started.***
- ***There are 4 Guides that you can use to learn more about Inspiration. To view these guides click on Start – My Computer – Local Disk [C:] – Program Files – Inspiration 7.6 – Inspiration Documentation – select the Guide you want.***

Step 2. Basic features

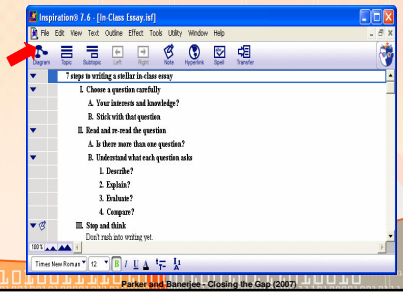
- ***Inspiration has two main views: Diagram view and Outline View.***
- ***Diagram View – This is where you can process, organize and prioritize information visually.***



"Inspiration" Module (Visuals)

Outline View –

The Outline view allows you to see your ideas in text format. You can toggle between Diagram View and Outline View. Click on the Diagram icon or Outline icon to go back and forth.



"Inspiration" Module (Metacognitive)

How Can I Use Inspiration to Take Reading Notes?

Clear your Inspiration page. Select some text that a college student might be assigned to read, such as a textbook chapter or journal article. Using Diagram view, create a map with all the main headings in that text. Then go back and expand your map by adding all the subheadings.

"Inspiration" Module (Any Time, Anywhere Access)

Info Flyer

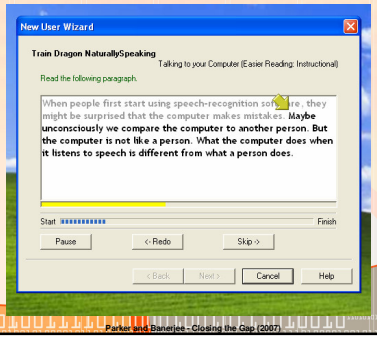
Software Overview
http://www.inspiration.com
➲ What is Inspiration anyway?
Inspiration®'s integrated diagramming and outlining views work together to help students comprehend concepts and information.
➲ What will Inspiration do for me?
In the **Diagram View**, students easily create and use concept maps, webs, and other graphic organizers. The result is clearer thinking, more creative projects, better organized writing, and improved student performance. With the click of a mouse, the student can transform an Inspiration diagram into a traditional hierarchical outline. While in the **Outline View**, students can quickly prioritize and rearrange ideas, helping them create clear, concise essays, reports, and more. Inspiration's one-click transfer instantly moves students' work to their favorite **word processing** program.
➲ What are the system requirements (see website for optional items)?
Windows:

486 processor or higher
Windows 95, 98, 2000, NT 4.0, Me or XP

Free Trial Download

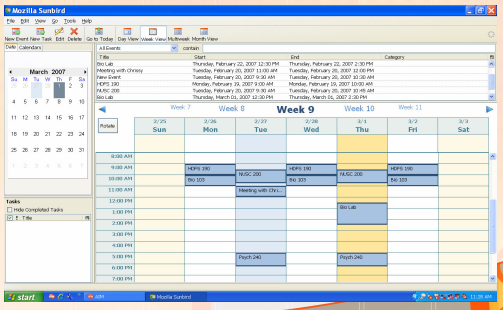
Student Artifacts

Distracted by visual "multi-tasking" when learning procedures for *Dragon Dictate*



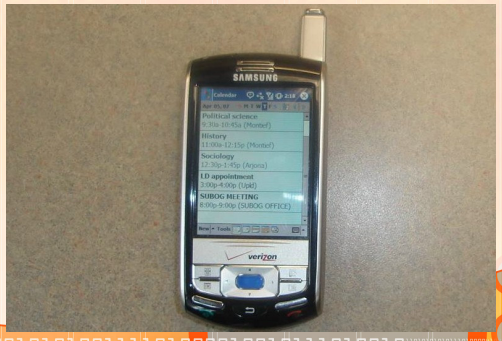
Student Artifacts

Metacognitive choices with *Microsoft Outlook*



Student Artifacts

Portable calendars via *Cell Phones*



Lessons Learned:
UPLD Learning Specialists' Feedback

- LS's needed to develop their own tech proficiency.
- Providing LS's with their own technology enhanced access and proficiency for staff and students alike.
- LS's drew upon students' learning profiles to promote choice when presenting tech-infused strategies.
- A baseline assessment of students' tech competencies could facilitate more individualized strategy instruction.
- Students needed to acquire proficiency with "mainstream" technologies (e.g., Microsoft suite, Vista, PeopleSoft), too.
- Finding sufficient time to help students fully develop proficiency with tech strategies could be difficult.

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