Schools and ICT—What the Future Holds
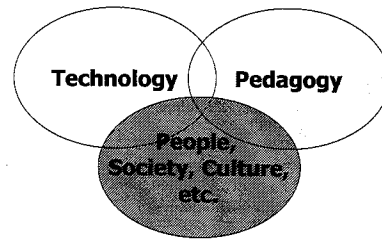
Curt Bonk, Professor, Indiana University
President, SurveyShare, Inc.
cjbonk@indiana.edu
http://php.indiana.edu/~cjbonk
http://SurveyShare.com

Nature and Nurture:
An Interactional Model

Technology | Pedagogy

People, Society, Culture, etc.

Poll #1. What are you???

A. Teacher, instructor, teacher assistant
B. Counselor, school psychologist
C. Curriculum specialist, developer
D. Instructional designer, technology specialist, multimedia developer
E. School administrator, principal, head
F. Government official, policy thinker
G. Student
H. Other

Poll #2:
Raise your hands if you are a digital native (grew up with a computer at home).
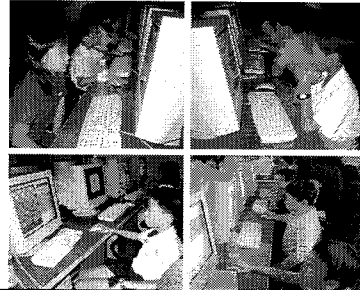
Poll #3:
What age learners are you interested in?

a. Ages 1-5
b. Ages 6-10
c. Ages 11-15
d. Ages 16-20
e. Ages 21+

Poll #4:
What age learners is online education growing the most in UK?

a. Ages 1-5
b. Ages 6-10
c. Ages 11-15
d. Ages 16-20
e. Ages 21+

Poll #5:
Should kids be allowed to bring mobile phones, MP3 players (iPods) to school?

MiamiHerald.com

Board OK's flip-flops, but iPods are out

Flip-flops are in for high school kids, out for everyone else. Also out: bedroom slippers, unhemmed clothes, iPods and laptops.

E-learning + Scotland = Major success, May 21, 2006
http://www.sundayherald.com/55719

"THE school of tomorrow will not be at the end of your street. It will be everywhere, and getting there will only take a click of a mouse. In this vision of the future, every school will have a web portal where the pupils, parents and teaching staff will have the opportunity to interact and share information. In this virtual space, lessons will be beamed direct to anyone who wants to attend, while all the teaching materials required can be downloaded in a trice. Video conferencing will facilitate group interaction while scholars from Tokyo to Tomintoul (Scotland) will log on to their personalised home pages to upload course work, view their marks or receive news about the wider school community."

Telegraph:
Flattening the world in 1860

Blogging now begins young

Mobiles have 'key role for young'

Eighth-grade students Tayler Bernholtz, left, Amy Lostroh and Kelsey Cardiff check out a weblog discussion related to the Civil War historical-fiction book 'Guerrilla Season' At South Valley Junior High School in Liberty, Mo. (Blogging now begins young USA Today, By Ashley Bleimes, USA TODAY, November 15, 2006, 12D). http://www.usatoday.com/life/2006-11-14-blogs-education_x.htm

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EXCITEMENT IN LEARNING

NEW...LOW COST
Audio Visual Method
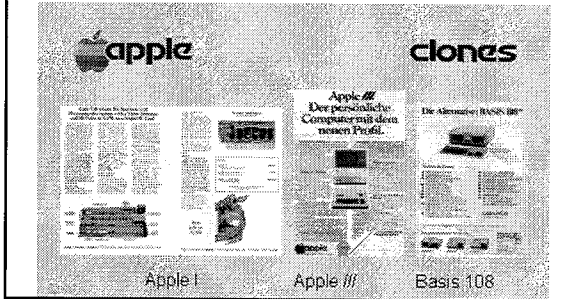WITH DISCUSSIONAL CONTROL

Dramatic NEW Teaching Aid...
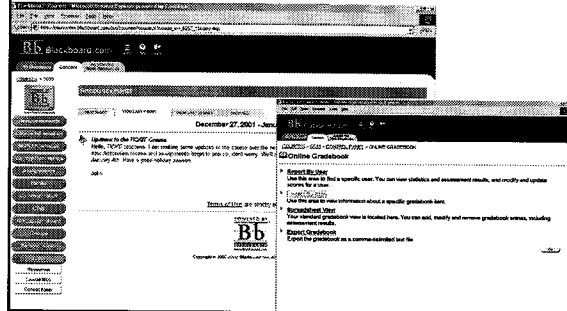
DUKANE CORPORA

AMERICAN OPTICAL OPAQUE PROJECTOR

Technology of the 1980s

The New Tandy 1000 EX
Complete with our Color Monitor
...at no extra charge
$799

Technology of the 1980s

apple   clones

Apple I   Apple III   Basis 108

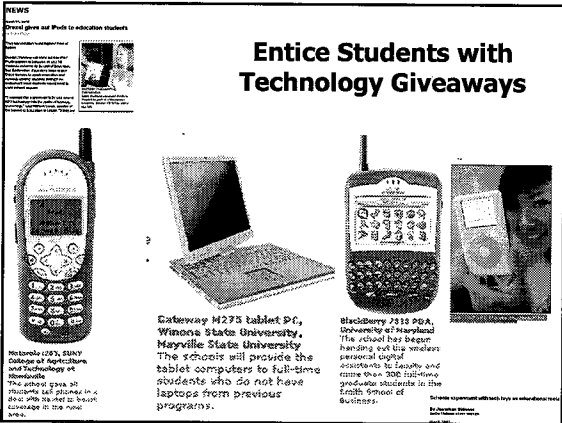## Technology of the late 1990s: Course Management Systems

Entice Students with Technology Giveaways

Technologies of the 2000's

Tech creates a bubble for kids

Alejandro Gonzalez, USA TODAY, Updated 6/20/2006 10:34 AM ET
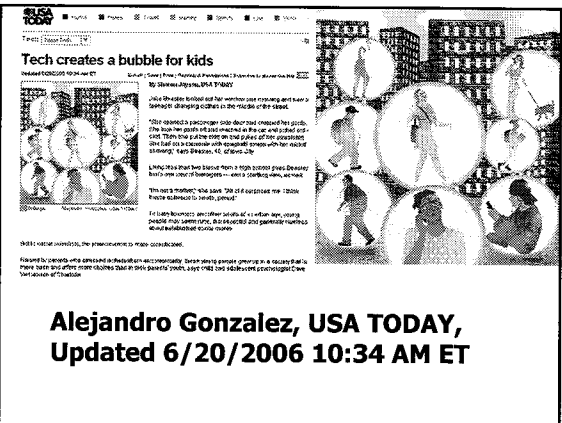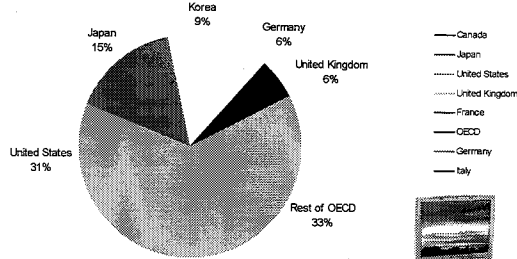
A Different Generation??? Multitasking...
"YOUNG AND WIRED," Katherine Seligman, San Fran Chronicle, Sunday, May 14, 2006

Gloria Kwan listens to her iPod while text messaging a friend who's in class.
Chronicle photo by Mike Kepka

Increased Broadband Access

Total broadband subscriptions, percentage of OECD, top 5 countries, June 2005

- Korea 9%
- Japan 15%
- Germany 6%
- United Kingdom 6%
- United States 31%
- Rest of OECD 33%

Legend: —Canada —Japan ······United States ·····United Kingdom —France —OECD —Germany —Italy

Source : OECD

Adapting Education to the Information Age (Ministry of Ed and HRD, Korean Education and Research Information Service, 2005)

ICT use among students
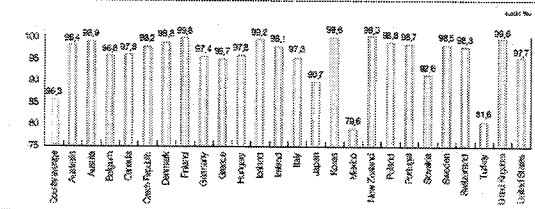
Source: OECD, OECD PISA 2003 Database

## Singapore and Taipei (Intel Press Release, 2006)

- Singapore, the island city-state in Southeast Asia, is about to complete a major new public/private project that will see large chunks of the 270 square mile city provided with Wi-Fi access by the end of 2008. The entire city, indoors and out, is due to be covered by 2015.
- In the coldest capital in Canada, the city residents of Iqaluit (pop. 6,000) enjoy free wireless from one free hotspot (with two more due soon to cover the suburbs), while Taipei, Taiwan (pop. 2.6 million) has a few more— over 4,000 hotspots that provide coverage for 90 percent of the city.

Effects of interactive multimedia in distance learning

Giti Javidi and Ehsan Sheybani, 2004, In Proceedings of the IASTED International Conference WEB-BASED EDUCATION

"The advancement in technology is shaping every aspect of our life, including education. One decade ago, the Internet was not critical to education. However, now, it has become an integral part of learning process. Internet technology is having a dramatic effect on colleges and universities, producing what may be the most challenging period in the history of higher education."

The Learning World has become Flat!

The Learning World is Flat

You.
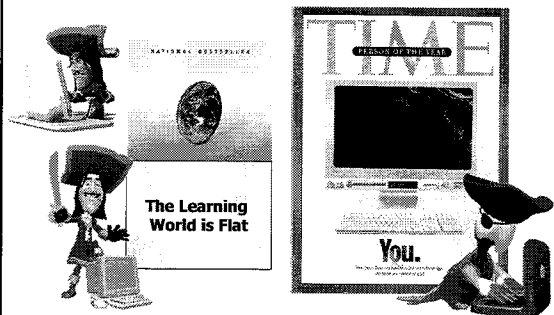
## The Ten Forces that Flattened the Learning World

1. Tools for Searching and Finding Information (e.g., Google, Yahoo!)
2. Rise in Demand for Online Learning
3. Open-Sourcing Learning: Sakai, Moodle, eduCommons
4. Collaboration (e.g., SharePoint, Groove, Word, Interwise, Breeze, Google Talk, Skype)
5. Learning Portability (Podcasting, Mobile technology)
6. Learner Empowerment and Individualization of Learning (Blogs, Wikis, etc.)
7. Online Portals of Information
8. Online Learning Object Repositories (MERLOT, Connexions, Careo, Jurom)
9. Open CourseWare (MIT OCW, Utah State, Johns Hopkins, Japan, CORE, OOPS)
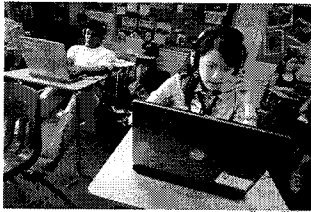10. Knowledge Brokers and Collectors

Part I. People, Society, and Cultures
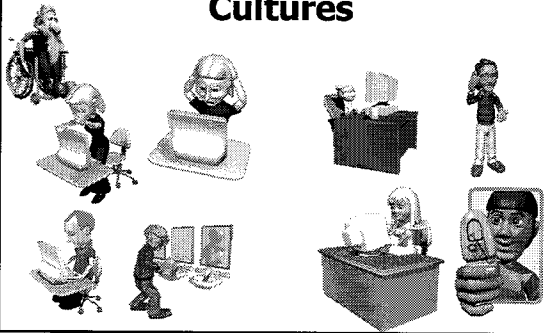
Who is demanding online learning?
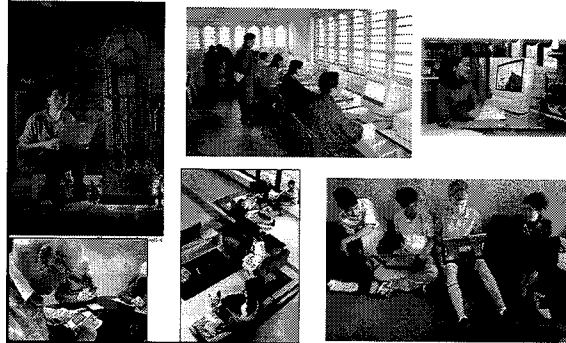
"YOUNG AND WIRED, Computers, cell phones, video games, blogs, text messages -- how will the sheer amount of time spent plugged in affect our kids?"
Katherine Seligman, San Fran Chronicle,
Sunday, May 14, 2006

Harker student Stephanie Lil (wearing a false nametag), during language class, recording her voice in Spanish for the teacher to evaluate later. Chronicle photo by Mike Kepka

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Yahoo News
Love me, love my blog," as Netorati couple-surf
BY SARA LEDWITH Thu Aug 3, 8:30 AM ET

- Nick Currie and his girlfriend Shizu Yuasa (R) surf the internet over breakfast in Tokyo in this handout photo. As the Internet evolves -- with its webcams, iPods, Instant Messaging, broadband, wi-fi and weblogs -- its image as a relationship-wrecker is changing. Now a sociable habit is emerging among the Netorati: couple-surfing. (Nick Currie/Handout/Reuters)

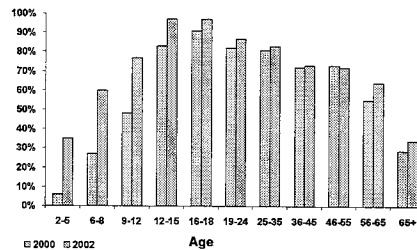- "For my birthday, he upgraded my RAM and I thought it was incredibly romantic," writes Jess.

INFORMATION TECHNOLOGY

Internet Use by Age
Susan D. Patrick, President and CEO
North American Council for Online Learning

2-5 6-8 9-12 12-15 16-18 19-24 25-35 36-45 46-55 56-65 65+

□ 2000 □ 2002   Age

Students prefer online courses — of age

Classes popular with on-campus students

Friday, January 13, 2006; Posted: 3:18 p.m. EST (20:18 GMT)

(AP) -- Andy Steele lives just a few blocks from the campus of Black Hills State University in Spearfish, South Dakota, so commuting to class isn't the problem. But he doesn't like lectures much, isn't a morning person, and wants time during the day to restore motorcycles.

So Steele, a full-time senior business major, has been taking as many classes as he can from the South Dakota state system's online offerings. He gets better grades and learns more, he says, and

Andy Steele takes an online course the library of Black Hills State University

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Simulation: Xer

- "The skill to be valued in the twenty-first century is not the length of attention span, but the ability to multitask - to do many things well at once.... [and] the ability to process visual information very rapidly." (**Rushkoff, 1996:50**)

Money

Generation Y: They've arrived at work with a new attitude

By Stephanie Armour, USA TODAY

Learner Control: Xer

- Xers expect a range of options, in terms of what they learn and how they learn it. They require autonomy and flexibility for their own learning. They demand a variety of instructional methods from which they can choose to learn, e.g., videotapes, self-paced modules, interactive CDs.
  - "Online gives me something to do when I'm bored with the professor."
  - "I respect myself more as a self-teacher."
    - Dziuban, Moskal, & Hartman (2005)

Neomillenial Learning Styles

Planning for Neomillennial Learning Styles: Implications for Investments in Technology and Faculty
Chris Dede, *Harvard University, Educause, 2005*

- **Fluency in multiple media**--value all types of communication, activities, experiences, not a single best medium
- **Actively seek, collect, and synthesize experiences**, rather than absorb a single best source
- **Active learning and collective reflection**
- **Non-linear and associated webs of learning**
- **Co-design of learning experiences for individual needs and preferences not pre-customized**

CAMPUSMOVIEFEST.COM showcases the collaborative work of tens of thousands of student filmmakers from around the world

What Students Need to Know:
21st Century Skills and ICT literacy;
Susan D. Patrick, President and CEO
North American Council for Online Learning

The future will demand people who can express themselves effectively with images, animation, sound, and video, solve real world problems that require processing and analysis of thousands of numbers, evaluate information for accuracy, reliability, and validity; and organize information into valuable knowledge, yet students are not learning these skills in school.

From: The Partnership for 21st Century;
www.21stCenturySkills.org
Report: are they really ready to work (2006).
http://www.21stcenturyskills.org/documents/FINAL_REPORT_PDF 9-29-06.pdf

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- Information and communication skills;
- Thinking and problem-solving skills;
- Interpersonal and self-direction skills;
- Global awareness;
- Financial, economic, and business skills; and
- Civic literacy.

From: The Partnership for 21st Century;
www.21stCenturySkills.org
Report: are they really ready to work (2006).
http://www.21stcenturyskills.org/documents/FINAL_REPORT_PDF 9-29-06.pdf

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Dual Coding Theory (DCT)

- Dual Coding Theory (DCT), proposed by Paivio in 1972, is a model that is based on Cognitive Information Processing Theory. DCT model assumes that information is processed and stored in memory by two separate, but interconnected systems - one visual, the other verbal. DCT claims that pictures are faster and easier to recall since they are coded in both memory systems and the visual system is continuous and parallel in its organization. Verbal memory, on the other hand, is structured in discrete, sequential units.

Nature and Nurture:
An Interactional Model
(20 tech trends)

Technology — Pedagogy

People, Society, Culture, etc.
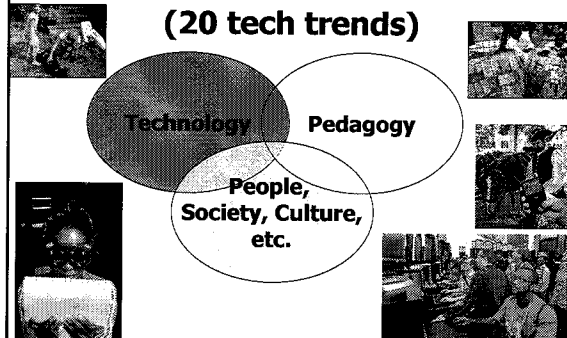
Part I. 20 Technology Trends

Trend #1. Education 2.0: Web-based services and other open technology alternatives is changing the nature of school software.

- Hoping to lure teachers and students, thus capturing the attention of a whole new generation of users, Google--the world's largest internet company--this year launched an online portal for educators, complete with lesson plans and other resources designed to help educators use the company's free online tools (such as Google Docs and Spreadsheets, an open alternative to Microsoft's Word and Excel) in their classes. The site also contains resources for using Google Maps in education, and Google last month ran an online project encouraging students from around the globe to brainstorm ways to slow or stop global warming--using the company's software to collaborate.

1. Online Maps and Videos
### (Sergey Brin, Co-Founder)

Google

- The Gmaps Pedometer, for example, can be used to visually map a walking route. The site updates the distance as you add more locations. From 96th Street and 1st Avenue across Central Park to 97th Street and Riverside Drive in Manhattan is 1.8 miles. You can even add a calorie counter. *Suggested activities:* Have your students estimate a distance (for example, from school to home), and use Gmaps Pedometer to check their estimate. For physical education, have students plan a walking program for exercise, then see how many calories their suggested program will burn.

Trend #2. Mobile Technology
All learning in one's own hands?
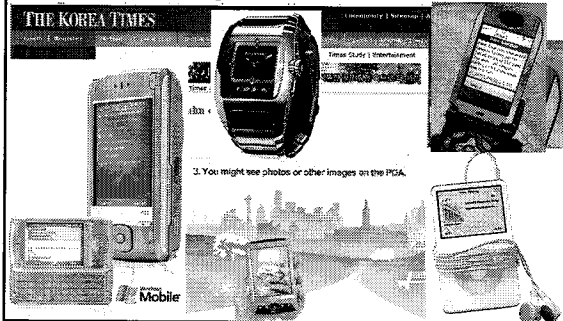
Cell Phone Dependent

- Debates in schools: cheating, off task, send compromising pictures, socializing, etc.
- 80 percent of the world lives in an area covered by wireless networks (Kirkpatrick, CNN Money, Dec 22, 2006).

Six ed-tech trends to watch in 2007
Gregg W. Downey, Editor,
eSchool News, December 22, 2006

Trend No. 1: The leveling power of the World Wide Web

- No longer need you be a major motion picture studio to create a box-office smash. You don't need a radio station to be a popular disc jockey. You don't need a television network to create a video that can be seen literally by millions.

Trend #3. YouTube co-founders Chad Hurley and Steven Chen.

Google-YouTube deal joins Net search and video forces

Trend #4. Webcast Lectures (slides synched)

Meaningful Learning

- Non-arbitrary, non-verbatim, substantive incorporation of new knowledge into cognitive structure.
- Deliberate effort to link new knowledge with higher order concepts in cognitive structure
- Learning related to experiences with events or objects.
- Affective commitment to relate new knowledge to prior learning.

Trend #5. Virtual Reality/Worlds First Course in a Virtual World (Second Life) Wednesday, August 30, 2006

Trend #6. Learning Object Portals MERLOT.org

Trend #7. Free Online Resources (e.g., Museum of Online Museums)

MUSEUM COMPUTER NETWORK

Trend #8. E-Textbook Revolution

Trend #9. Virtual Worlds/Virtual Reality/MMOG

Trend #10. Visualization Tools: Ancient Rome Virtually

Trend #11. Growth in Collaboration and Virtual Teaming

Trend #12. Skype: Online Voice and Text

Trend #13. The $100 Laptop

The project aims to build peer-to-peer communications

The CM1: Taking technology to the developing world
A revolution in a laptop
By Greg Norman
Sunday 13 August 2006, 18:49
Makka Time, 15:49 GMT

Negroponte says the new laptop is designed to be kid-friendly

OLPC aims to turn the tide of urban poverty

Trend #14. Open CourseWare and Open Source Software

TuftsOpenCourseWare

## Open University of UK

Technology in the Developing World
(Kirkpatrick, Dec 22, 2006, CNN Money)

- **The Global Education and Learning Community (GELC) aims to bring the principles of open source to education. Scott McNealy, former CEO of Sun Microsystems, is working to create a free universal curriculum from Kindergarten to 12th grade in every major subject. Any educator/researcher can contribute and it will be in any language.**

Trend # 15. Electronic Books
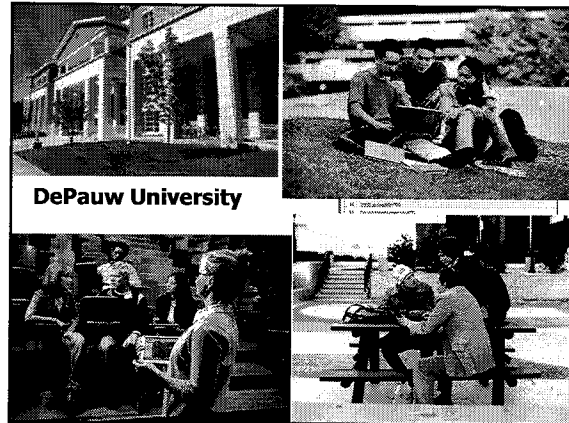## (e.g., The Sony Reader)
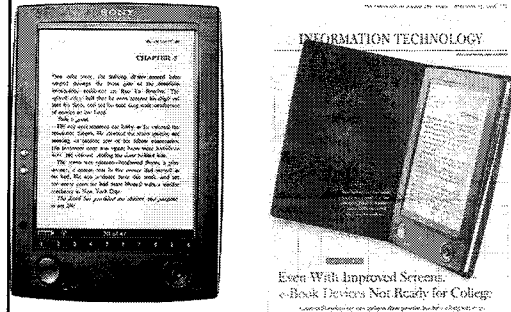
Trend #16. Wireless Technology

MOST (UN)WIRED SCHOOLS?
CNET and U.S. News and World Report got the top 50 universities' tech specs and asked them which computers they recommend to students and faculty.

Handheld Computing

DePauw University

Trend # 17. Social Networking Software (Web 2.0)

Trend #18. Blogging

Quarter	Blog Population
Q1 2000	29,500
Q2 2000	66,100
Q3 2000	115,000
Q4 2000	197,000
Q1 2001	352,000
Q2 2001	628,000
Q3 2001	951,000
Q4 2001	1,200,000
Q1 2002	1,570,000
Q2 2002	2,140,000
Q3 2002	2,570,000
Q4 2002	3,070,000
Q1 2003	3,730,000
Q2 2003	4,680,000
Q3 2003	5,760,000
Q4 2003	7,300,000
Q1 2004	9,620,000
Q2 2004	12,600,000
Q3 2004	16,200,000
Q4 2004	21,000,000
Q1 2005	31,600,000
Q2 2005	37,800,000
Q3 2005	45,200,000
Q4 2005	53,400,000

Hosted Blog Growth

Growth Rate

606%
126%
131%
105%

Vlogging (Video Blogging)
e.g., Andy Calvin's Waste of Bandwidth

Educational use of Blogs

For instructors	For students
• **Professional practice**	• **Reflections or journals**
• **Networking and knowledge sharing**	• **Dialogue with peers**
• **Course management tool**	• **Group work**
•	• **Communicate with instructor**
	• ... ...

Blogging Questions

1. **Who has a blog? Any for a specific class?**
2. **Who regularly reads other people's blogs?**
3. **Who assigns blogging tasks?**
4. **Who has created a video blog?**
5. **Who thinks it is an utter waste of time to blog?**

Adventure Blogging = Reality Teahcing and Learning
(Ben Saunders, Mark Fennell)

Trend #19. Wikis

Wikis

Debates about Wiki Quality

For Teachers New to Wikis

- Wikis are free, online writing spaces.
- Wikis use simple formatting rules, so no HTML understanding required.
- Highly collaborative composing and creativity
- Authors do not claim ownership
- Published online
- Wikis provide a history and anyone can revisit prior versions of text

How use in teaching

1. Provide space for free writing
2. Debate course topics and readings
3. Share resources (websites, conferences, writing, etc.)
4. Maintain group progress journal
5. Require group or class essay
6. Have student revise Wikipedia pages
7. Write a wikibook

Wiki Questions

1. Who regularly reads Wikipedia articles just for fun?
2. Who regularly reads Wikibooks?
3. Who seeks Wikipedia for content?
4. Who has edited or written new articles on Wikipedia or Wikibooks?
5. Who thinks it is ok for college students to cite from Wikipedia?

Sample Junior Book (Dinosaurs)
http://en.wikibooks.org/wiki/Main_Page

Trend #20. Podcasting, Webcasting, and Coursecasting (Adam Curry; www.dailysourcecode.com)

Brandon Hall, Chief Learning Officer Magazine, July 2006

"Podcasts provide a way to distribute an audio or video episode via the Internet for playback at any time on any MP3 device or PC. Podcasts allow training in the form of event capture, new product information, sales tips, orientation, etc. to be delivered on a just-in-time, just-enough basis to anyone anywhere."

Podcasting

The quality of some of the podcasts I have listened to is certainly as good as many supposedly professional radio stations

Podcast Questions

1. Who has listened to a podcast?
2. Who listens to a certain podcast on a regular basis?
3. Who has created a podcast?
4. Who has created a vodcast?
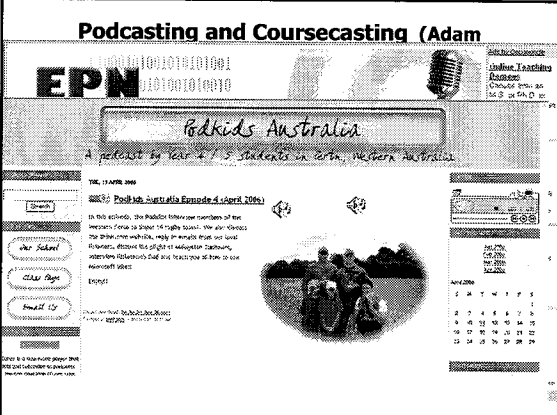5. Who thinks podcasting is simply more talking heads?

Webcasts: WorldBridges Goals

What is Worldbridges?
- Worldbridges is a network of individuals and organizations that use live, interactive webcasting and other new media technologies to help people connect, learn, & collaborate.
  (Webheads, Koreabridge, Worldbridges Tibet, EdTechTalk, etc.)

Goals & Values
- Our primary goal is to foster understanding and cooperation amongst the citizens of the world. We value civility and respect, open source collaboration, fair distribution of income, and a sense of world identity.

Podcasting and Coursecasting (Adam

Art and History Exhibits

Personal music players: An artwork in progress

Podcasting
http://itunes.stanford.edu/
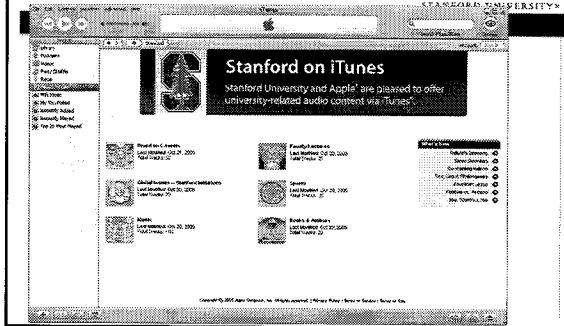
Listen: iTunes, PodcastAlley
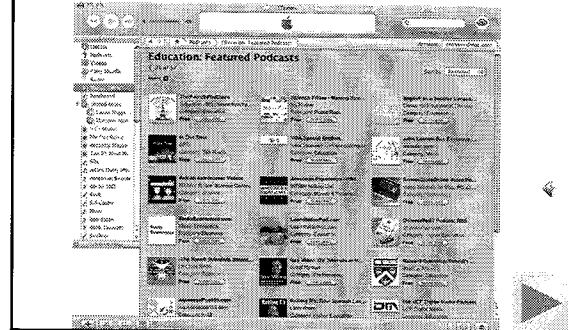
Educational Applications of Podcasting

1. Recordings of lectures (Coursecasting)
2. Supplemental textbook or entire book
3. Student projects
4. Interviews
5. Language lessons
6. Oral reports
7. K-12 classroom interactions
8. Downloadable library of resources
9. Recordings of performances

10 Trends

- From: Bonk, C. J., & Kim, K. J. (in press). Future directions of blended learning in higher education and workplace learning settings. To appear in C. J. Bonk & C. R. Graham (Eds.). *Handbook of blended learning: Global Perspectives, local designs.* San Francisco, CA: Pfeiffer Publishing.

Philadelphia's $63 million "School of the Future" — built under the guidance of Microsoft Corp (September 8, 2006)

The Rise of Cyber-Children!
Good computer literacy is seen by many to be an essential skill
July 28, 2006, BBC

15
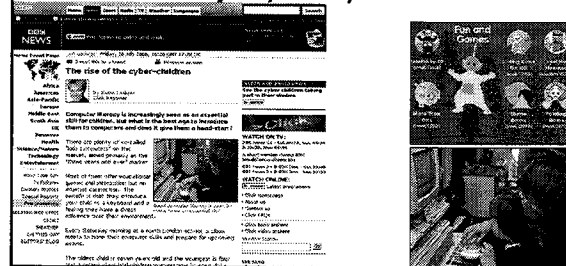
Personal Learning Environments: Challenging the dominant design of educational systems

Scott Wilson, Prof. Oleg Liber, Mark Johnson, Phil Beauvoir, Paul Sharples & Colin Milligan, University of Bolton

Blending Learning and Work

06)

477

FIGURE 34.1. PAST, PRESENT, AND FUTURE OF BLENDED LEARNING.
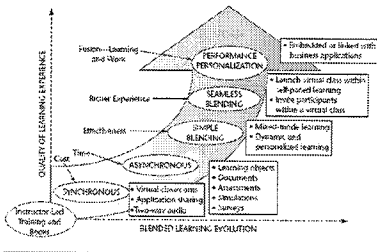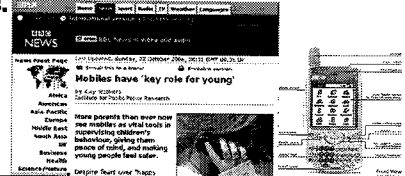

Trend #1.
Mobile Learning

- Increasing use of mobile and handheld will create rich and exciting new avenues for learning. Teachers can deliver instruction and participate in class from more locations.

Trend #2.
Greater Visualization, Individualization, and Hands-on Learning

- **Online and FTF learning environments will increasingly become individualized; in particular, emphasizing visual and hands-on activities.**

Trend #3.
Self-Determined Learning

- ICT will foster greater student responsibility for learning. Decisions about the type and format of blended learning will be made by students instead of instructors or instructional designers. Learners will be designing their own programs and degrees.

Trend #4.
Student Expectations Rise

- Students will be used to having more choices and selections so their expectations will rise as do the expectations of their parents.

Trend #5.
Personalized Learning Environments

- There will be increasing focus on providing the learner with what he or she needs and wants with the growth of personalized learning environments (PLEs) during the coming decade.

Personalized Learning Environments
(Mark Johnson et al., University of Bolton, 2006)

- Web 2.0 technologies including social networking software, weblogging, Wikis, personal publishing, authoring tools, tools for collaboration (e.g., Writely), news aggregators
- Other tools include calendaring and scheduling tools, email, chat and instant messaging.

Personalized Learning Environments
(Mark Johnson et al., University of Bolton, 2006)

- Context—providing a preferred context for learning.
- Conversation patterns—supporting conversations in learning and moderating that learning
- Team—helping connect one to others who share similar learning interests.
- Activities—matching one's learning activities to one's learning preferences.
- Social events—matching people for learning events based on personal profiles, preferences, and contacts.
- Technology—making tools available that prefer.

Personalized Learning Environments

- Providing learning paths for students.
- Offering portfolios that stay with learner—showcases work.
- Students select from a range of learning environments, courses, and instructors.
- Learner cohorts are made up of students from various countries of choice.
- Age grouping is less relevant and instead a push for more learning by interest, knowledge, and experiences.
- Instructor will be on display for learner selection.

What is the Web 2.0?

What Is Web 2.0
Design Patterns and Business Models for the Next Generation of Software

by Tim O'Reilly
09/30/2005

In our initial brainstorming, we formulated our sense of Web 2.0 by example:

Web 1.0		Web 2.0
DoubleClick	-->	Google AdSense
Ofoto	-->	Flickr
Akamai	-->	BitTorrent
mp3.com	-->	Napster
Britannica Online	-->	Wikipedia
personal websites	-->	blogging
evite	-->	upcoming.org and EVDB
domain name speculation	-->	search engine optimization
page views	-->	cost per click
screen scraping	-->	web services
publishing	-->	participation
content management systems	-->	wikis
directories (taxonomy)	-->	tagging ("folksonomy")
stickiness	-->	syndication

Personalized Learning Environments

- Access to experts for apprenticeship
- School no longer over when leave premises; in a virtual school, learn all the time.
- Internet provides video on demand and at low cost
- Teachers rotate among groups of students to provide their expertise where and when needed

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Trend #6.
Increased Connectedness, Community, and Collaboration

- ICT will open new avenues for collaboration, community building, and global connectedness. It will become used as a tool for global understanding and appreciation.

Trend #7.
Increased Authenticity and On-Demand Learning

- Online learning will focus on authenticity and real world experiences to supplement, extend, enhance, and replace formal learning. As this occurs, blended learning will fuel advancements in the creation and use of online case-learning, scenarios, simulations and role play, and problem-based learning.

Trend #8.
Linking Work and Learning

- As blended learning proliferates, the lines between workplace learning and formal learning will increasingly blur. Higher education degrees will have credits from the workplace and even credit for work performed.

Trend #9.
Less Predefined Schedules

- When teachers are teaching and students are learning is less clear. New norms and measurement scales will emerge.

Trend #10.
Changed Instructor Roles

- The role of an instructor or trainer in a blended environment will shift to one of mentor, coach, and counselor.

A Final Quote:
It's a long, long road...
With many a winding turn.
That leads us to who knows where?...

It's a long, long road
From which there is no return
While we're on the way to there
Why not share

(The Hollies, 1969; He Ain't Heavy,
He's My Brother; B. Scott - B. Russell)

Podcasts and Wikis and Blogs Oh My!
(Sample articles at PublicationShare.com
archived Talks at TrainingShare.com)

James Bonk

THE HANDBOOK OF
BLENDED
LEARNING