**Information Technology:
Transforming Adult Education
One Byte at a Time**

*Probably the only certain thing about
technology in education is that it's changing.*

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Welcome to my presentation, Information Technology: Transforming Adult Education One Byte at a Time.

Please adjust your speakers before continuing.

Education, Information & Technology

- Education and information have always been connected.
- Technology increases information accessibility.
- Technology affects pedagogy.

Billie R. McNamara   HRD 630 – Spring, 2008   2

Education has always been about information and the development of skills to handle it in appropriate ways.

What has changed is the rate at which information of all kinds is being accumulated and the relative ease with which information can be accessed.

"In the hands of skillful and dedicated teachers, new information technologies have the potential to greatly improve the educational process" (Williams, 2002, p. 1).

Learning environments that employ technology are not replicas of traditional classrooms in a different setting. Technologically enhanced learning provides numerous creative opportunities for instructors, learners, administrators, and policymakers. The "classroom" is no longer required to exist in a brick-and-mortar structure. Students and teachers can be hundreds of miles apart. Asynchronous communication and assistive devices allow individuals to learn according to their own schedules and styles.

At the same time, technology creates obstacles for each of those stakeholder groups while often challenging institutional infrastructures. A diversity of ages and learning styles among students, instructors' unfamiliarity with technology, replacement of "live" faculty with digital delivery, and volatile institutional budgets are among the top-ranked topics of concern in the industry's literature, especially among post-secondary education providers.

In this presentation, we will consider the implications of information technology at the post-secondary level on instructional pedagogies, curricula, efficacy and efficiency of students and instructors, and our understanding of teaching and learning.

2

Within education circles at all levels, there is a substantial, vocal, and seemingly never-ending debate over the value of technology as a teaching tool.

Some regard information technology as the third great revolution after the invention of written language and the printing press (Spender, 2002).

Those who support expansive technology implementation in classrooms claim "there will be major substantive benefits from more widespread academic uses of information technologies in the areas of content, curriculum, and pedagogy" (Gilbert & Green, 1995, p. 4).

They suggest – often strongly -- that schools and teachers **must** embrace the e-learning revolution (Spender, 2002).

The zealots propose radical changes in the way we define and deal with knowledge (Spender, 2002).

Must we take an "all or nothing" view of alternative pedagogies arising from technology implementation?

Those who urge a more cautious approach to the use of technology to support learning worry educators are throwing the baby out with the bath water by moving too quickly toward replacing traditional, instructor-led learning with student-centric, technology-driven lessons (Thorne, 2007a).

They caution that technology must be viewed in context of its use (Bromley, 26).

They maintain technology precludes development of intellectual understanding and does "not foster all or even several types of learning, but rather one particular -- and particularly narrow -- conception" (Bromley, 22).

The curmudgeons warn against letting IT drive teaching and learning (Bromley, 26). Otherwise, they believe, a pedagogical imbalance will result (Bromley, 26).

Richard Sclove, the author of *Democracy and Technology*, argues "The Web is marvelous … but it's not a vehicle for building up depth of intellectual understanding." Sclove finds "[t]he extent to which students rely on the Web as their primary learning vehicle is deeply troubling." He believes "if technology is used as a substitute for engaged, exciting research and teaching, it's going to be detrimental" (Sclove, _____).

Please advance to slide 4.

Does IT Dominate in Education?

- Media wars
  - Computers *vs.* books
  - Multimedia *vs.* blackboards
  - Lectures *vs.* digital modules
- Attitudes
  - Educators
  - Non-educators

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In 1995, Gilbert & Green wrote "Today, given great claims for computers, video, and IT, for better or worse, the book, blackboard, and lecture continue to dominate instruction" (p. 3).

Recent studies report the trend has continued.

Computer science professor Randy Pausch, perhaps recently best known as the subject of the book *The Last Lecture*, maintains the blackboard and mass-produced textbook are the greatest inventions in education (2002, p. 1).

Futurist David Pearce Snyder claims education, especially at the post-secondary level, is in the midst of a revolution driven by the ubiquity of technology outside the classroom, and education must step up.

Yet, "in an environment where students are 'customers,' knowledge is a 'product,' and faculty are 'human resources' or 'content providers,'" … how is technology likely to be used?" (Bromley, p. 25).

Please advance to slide 5.

Purposes of IT in Education

- Support for teaching
  - Type I and Type II applications
- Improve student learning
- Offer flexible learning opportunities
- Improve efficiency and efficacy of learning
- Encourage creativity

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A common method for describing implementation of technology in education is Maddux, Johnson & Willis' (1992) typology, which divides learning applications into two categories:

Type I uses technology to make traditional teaching methods more efficient (i.e., quicker and easier). An example of Type I is using a word-processor to prepare lesson-related worksheets. Type I is teacher-centric.

Type II applications offer new ways of teaching that would not otherwise be possible, such as simulations and student-created media. Type II is student-centric.

Those who champion Type II applications argue that integration of technology in education is intended "to improve student learning, to offer flexible learning opportunities, and to improve the efficiency" and efficacy of learning (Toomey, 2001).

However, other experts believe the burden of efficiency and efficacy does not require new technologies. Rather, instructors simply need to "apply existing technologies fully to improve the academic experience and performance of every student" (Wilson, n. d., par. 22).

Stanley Williams, a Hewlett-Packard Fellow, suggests, "The future of education will be profoundly affected by forthcoming information technology. But, even more importantly, it will be affected by how educators and students use the technology to prepare for life-long learning in [anticipation of] what some predict will be unrelenting [, global] change" (Williams, 2002, pp. 1-2).

Williams warns against "blind acceptance and inexpert use," which have "the capacity to crush creativity"regardless of how student-centric learning may be (Williams, 2002, pp. 1-2).

Please advance to slide 6.

5

Several important studies have correlated teachers' acceptance of technology as a teaching tool with their levels of technological and pedagogical ability (Hadley & Sheingold, 1993; Becker, 2000 and 1994; Cuban, n.d.; Pierson, 2001).

Researchers Amey and VanDerLinden (2003), propose "The real technology challenge in education involves people" (p. 93).

They warn that technology may be perceived as a threat to the identity and efficacy of faculty.

Faculty are generally divided into two groups: Those who are excited by new technology and its implementation and those "who are reluctant to alter their approach to learning for fear of losing what they value" (Amey and VanDerLinden, 2003, p. 88).

Over the past couple of decades, researchers have consistently found teachers want the same things: current technology easily accessible in the learning environment as well as time and support for learning to use technology.

The NEA's higher education coordinator, Christine Maitland, recommends, "The capacity of the knowledge society suggests that teachers again need to become the creators of the materials they work with" (Maitland, par. 19).

Many teachers do not believe self-education provides them with this opportunity (Hadley & Sheingold, 1993; Becker, 2000 and 1994; Cuban, n.d.; Pierson, 2001).

At least one author proposes successful integration of IT in the learning environment requires that teachers' pedagogical skills be developed along with their technology skills (Pierson, 2001).

In a seminal report on technology in education published by the NEA and titled *Vision 2020*, The Learning Federation predicted the following: Teaching will become more personalized. "Given an aggressive national investment and skillful management, technologies ... could transform learning -- making it more productive, more personalized and more compelling for learners of any age and with any background. These technologies will make it possible to implement a range of powerful new instructional strategies long recommended by experts in cognition, but which were previously unaffordable. ... These new learning systems will change the process of learning, redefine the role played by the teachers, and create an enormous range of challenging new teaching occupations. What they will not do is replace the need for human teachers." (TLF, 2002, p. 1).

In separate studies – 1994 and 2000 – Henry Becker found Constructivist-compatible beliefs to be prevalent among teachers who implement technology as a teaching tool. Constructivism is a student-centered philosophy of education. Let's next look at the student's perspective (Becker, 2000 & 1994).

Please advance to slide 7.

Focus on the Student

- Self-direction vs. teacher-led learning
  - Student efficacy
    - Preparation for self-direction
    - Comfort level with technology-based instruction
  - Effectiveness
    - Tailored software compared to "live" instructor
    - Traditional classroom *vs.* digital environment
  - Constructivism / learner-centered
- Millennial Generation's impact
  - Digital delivery
  - Anytime-anywhere learning
  - Peer-to-peer "Communities of Practice"

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Learners' self-direction is a fundamental principle of adult education. However, the research of William Perry and numerous others has found many students at the post-secondary level are ill-prepared for self-direction at the beginning of their learning.

Some experts believe teaching software can be tailored to meet adult students' needs the way an experienced teacher can (Pausch, 2002).

Yet, IT detractors warn, "Adult learners may not always find on-line instruction a comfortable, appropriate learning environment" (Amey & VanDerLinden, 2003, p. 87).

Despite this, many post-secondary programs and educators practice Constructivism, a learner-centered philosophy popular at the post-secondary level, when designing technology-enhanced curricula.

Is a learner-centered approach the best method for teaching adults with technology?

David Pearce Snyder, an expert on higher education, answers resoundingly, "Yes!" Snyder argues, "A growing body of pedagogical research tells us that at least one-half of all students do not learn effectively in a traditional classroom setting."

Those who disagree with Snyder argue "re-centering higher education pedagogy from teachers to students" is not a basis for claiming "traditional approaches may be too rigid to accommodate" students' needs (Burgan, 2006, par. 2).

Gillian Thorne, director the Early College Experience program at the University of Connecticut's Institute for Teaching and Learning, agrees with Snyder's

Focus on Teaching & Learning

- Effect on the curriculum
- Effect on instructional delivery
- Effect on goals and outcomes
- Evolving pedagogy
- Replace instructors?

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Regardless of their consequences for the curriculum, "the most compelling technological innovations do not require extensive analysis before they become widely adopted and integrated" (Gilbert & Green, 1995, p. 2).

Instructors have a variety of reasons for implementing Information Technology in their teaching activities, including efficacy (i.e., convenience and comfort), effectiveness (especially for basic skills or rote drills), and efficiency (i.e., making full use of resources) (Bailey, 2007).

This leads to several questions:

"How do we help our teachers recognize when a traditional or alternative approach is appropriate?" (Bateman, 2007)

"Can we challenge teachers to make sense of a range of ideas and realities?" (Bateman, 2007).

Should instructors first consider the desired goals and outcomes, or should they begin planning instruction by inventorying the available technology?

Some post-secondary authors argue, "Rather than starting with what we want to accomplish and then examining how technology might be used to achieve those goals, we more often approach our computer decisions with the attitude 'This technology exists; we've got to use it.' The result? Educational computing is largely technology-driven rather than curriculum-driven. It is more of the same, only automated" (Bromley, 21).

"To some extent, outcome and delivery method ought to be linked." This "brings us around in a circle – do we have the same meanings when we talk … about 'teaching' and 'learning'? (Tomkinson, 2007)

Technologically enhanced education appears to be developing its own pedagogy, especially in distance education (Phipps, 2004, xii).

But will technology replace instructors?

Is fear of replacement at the heart of some techno-phobes' disdain for technology?

Computer science professor Randy Pausch (2002) does not believe that will happen. He argues students will miss the opportunity to learn from experts because, despite technology, experts won't have time for student interaction. Technology won't replace teachers because humans are gregarious by nature and students need to model their learning, especially higher-order skills such as reasoning and judgement.

Other studies agree that faculty may be overwhelmed by students' expectations in the 24/7 world of e-mail and on-line learning (Amey & VanDerLinden, 2003).

Miles Groth (2007) argues students want and need professors who have a "unique set of experiences and both a venue and willingness to share them with younger people" (p. 2). Groth claims technology does not "compel students" toward personalizing learning (p. 4) and is not "an adequate substitute" for the stories professors can share (p. 3). Multimedia and the Web may make information accessible, but information is not "meaningful and memorable" (p. 5). In person, instructors can tailor presentations to students' individual learning styles. Groth writes, "We have learned how students learn and when not to say something. Unlike a videotape, we know when to stop. A PowerPoint presentation cannot sense when not to move on to the next point. Because a film is speaking to everyone in the room there is a chance it may not be speaking to anyone" (p. 5).
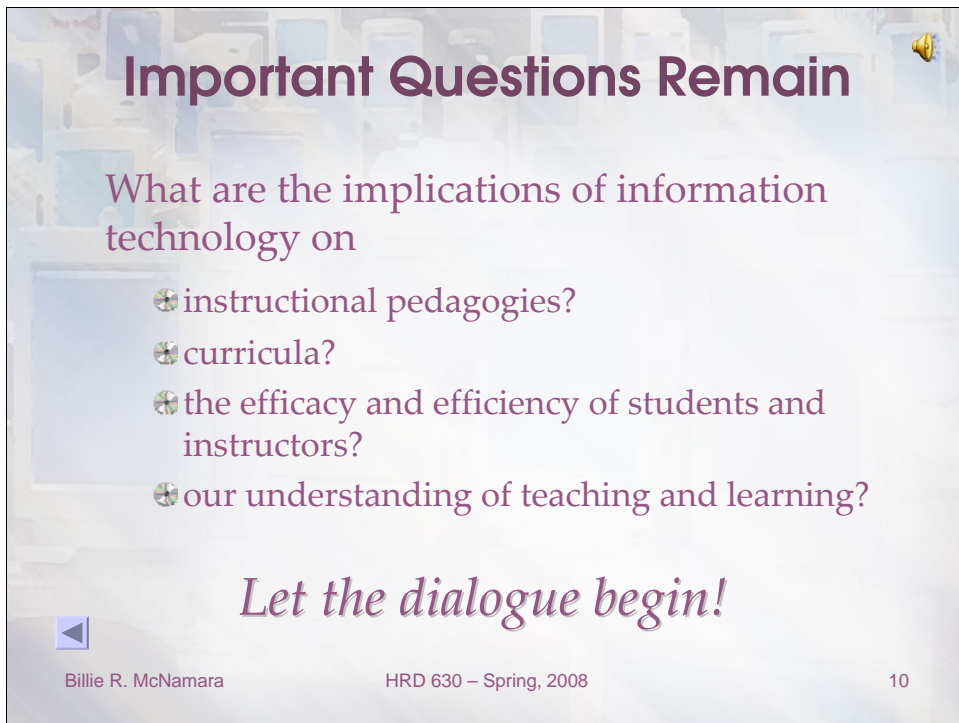
Please advance to slide 9.

In describing his vision of the Optimized University of the future, Carl Wieman (2006) writes,

"Everyone is aware of the enormous increases in the capabilities of information technology. … These offer many fairly obvious opportunities for dramatically changing how teaching is done in colleges and universities and, in the process, making higher education more effective and more efficient. … The full use of the research on teaching and learning, particularly as implemented via modern IT, can transform higher education" (pp. 4-5).

Please advance to slide 10.

Important Questions Remain

What are the implications of information technology on

- instructional pedagogies?
- curricula?
- the efficacy and efficiency of students and instructors?
- our understanding of teaching and learning?

Let the dialogue begin!

Billie R. McNamara   HRD 630 – Spring, 2008   10

I hope this presentation has given you much to think about with regard to the effects of Information Technology on post-secondary education.

Considering Wieman's remarks, numerous important questions remain to be answered.

What opinions and experiences can you share?

I look forward to engaging in dialogue on the implications of IT on instructional pedagogies, curricula, the efficacy and efficiency of students and instructors, and our understanding of teaching and learning.

Thank you for participating.