“Re-imagine teaching and learning”
Predictions

- Increasing numbers of educators will be using technology-driven content that can better engage students and offer more meaningful learning experiences.
- Bill Gates believes that technology will change higher education in the next five to ten years with a move away from printed textbooks due to the growing real and perceived advantages of delivering content in digital form.
Emerging Technologies (Horizon Report, 2011)

On the near-term horizon within the next 12 months

- Electronic books
  - Mobiles enable ubiquitous access to information, social networks, tools for learning and productivity

The second adoption horizon considers technologies expected to gain widespread usage within two to three years

- Simulation/Augmented reality
- Game-based learning

Looking to the far-term horizon, four to five years from now for widespread adoption

- Gesture-based
- Computing and learning analytics
What is Driving This Revolution?

Challenge that global competitiveness in 21st century presents to our educational system

Students need to be able to adapt to the rapid changes in technology

Students need to be able to access information just-in-time to solve real-world problems
Demand for Choice

People expect to be able to work, learn, and study whenever and wherever they want

Students want cheaper and more portable content

Students want more choice and flexibility in how to receive and use content based on their personal preferences and learning styles

Student want more engaging and dynamic learning experiences
Educational Ethos

Distributed teaching and learning

Collaborative teaching and learning

Learning is more personalized and self-directed
Knowledge Construction

- In the 21st century our work and our lives center on the creation, communication, and application of knowledge.
- According to George Siemens (2006), our conceptual world view of knowledge as static, organized, and defined by experts is in the process of being replaced by a more dynamic and multi-faceted view.
- Today, learning and knowledge can be viewed as a network phenomena influenced by socialization and technology.
Critical Thinking

- Not enough to simply transmit knowledge to learners as primary goal of learning
- Learners need to have skills to work with active knowledge base
- To acquire knowledge, learners need to think critically which involves:
  “Calling into question the assumptions underlying their customary, habitual ways of thinking and acting and then being ready to think and act differently on the basis of this critical questioning.” (Brookfield, 1987)
Content is Emerging with a Unique Ecological Structure

Ecological Structure of Content for Learning

- Textbook Content
- Assessments
- Digital Assets
- Hyperlinked Resources
Transformation of Learning

• Digital content will fulfill the promise of 21st-century learning:
  • Flexible to make learning student-centered
  • Malleable enabling teachers and students more easily consume, manipulate and leverage information to address specific learning objectives and match individual learning modalities
Transformation of Teaching

- Personalized learning to meet individual student needs
- Data capture on how students interact with the content to quickly adapt teaching
- Automated tasks to focus more on classroom instruction
Integrated Content Devices

- Integrated content devices allow students to stay connected to resources and develop personalized learning experiences that will help them understand what they are experiencing in real-world contexts.
- Always-on Internet and the portability of the tools to access it.
  - Ultra-portable computers, tablets, and smartphones embody the convergence of several technologies that lend themselves to educational use with features such as video chat and collaborative content creation tools could ultimately lead to a change in the very meaning of education.
  - E-books, video conferencing, applications for media creation, social networking tools, augmented reality.
Pedagogical Design for Skillful Integration of Media and Instructional Methods

The role and influence of media on learning and teaching is optimized when it is skillfully integrated into the educational experience.

For this to happen we need to focus our attention on the careful design of what learners “do” in the learning experience rather than the presentation of the subject matter content or the technology.
Learner-to-Content Interactions

- Active intellectual interaction between the learner and the content that leads to knowledge construction
- Electronic resources can offer learner-to-content interactions at:
  - Different levels of difficulty
  - Different modalities
  - Allow for direct student response to content
Pedagogical Design of “Learning by Doing” Can Optimize Learning Via Technology

- Multiple perspectives
- Multiple topics
- Clarification
- Elaboration
- Explanation
- Illustration
- Practice
- Apply
- Assess

Content Choices
Mayer’s Multimedia Theory

Encourage the mind to make connections through:

- Hypertext
- Graphics/Illustrations
- Audio/Video
- Animations
- Simulations
According to Garrison, Anderson, and Archer (2001), cognitive presence is “the extent to which the participants in any particular configuration of a community of inquiry are able to construct meaning through sustained communication” (p. 5).

A community of inquiry occurs when learners work together to construct experience and knowledge by using critical thinking to analyze the subject matter, asking probing questions, and challenging assumptions.
Emerging Communication Patterns

- Patterns of communication support active learning, critical thinking and knowledge construction
- Multi-directional communication supported among students, experts and the instructor
- Credibility and expertise in a social network comes from the extent of involvement in the network and the use of active learning and critical thinking to construct knowledge
Collaborative Learning Tools

- Collaborative tools are the cornerstone of social constructivist learning approaches made possible by technological advances.
- If online education is to fulfill its’ potential as a medium in which truly social constructivist learning is the standard, then these tools will have to become central to the process.
Social Networking & Collaboration

- Use social networking: 82%
- Tagged or categorized content online: 28%
- Visited video sharing sites: 48%
Communication Tools

- Email/Coursemail
- Chat/Instant Messaging
- Blogs
- Wikis
- Social Networking
- VoIP
- Web Conferencing
- Virtual augmented realities
Simulation & Augmented Reality Supports Authentic Problem-Based Learning

- Reduces cognitive load by placing the activity directly in the context of authentic and relevant real-world problems
- Self-paced and adaptable to student’s own learning styles
- Allows for testing of the hypotheses developed by students
- Allows the problem itself be replayed with other solutions so that students can realize the consequences of each of the applied answers to the problem
Critical Challenges

- Economic pressures and new models of education are presenting unprecedented competition to traditional models of the university
- Digital media literacy continues its rise in importance as a key skill in every discipline and profession
- Keeping pace with the rapid proliferation of information, software tools, and devices is challenging for students and teachers
The Digital Divide

- Disparity in access to technology
- Less information literate – more difficulty to use digital content effectively and comfortably
Conclusions

- Technology can support the creations of powerful learning experiences that incorporate authentic, real-world applications.
- Collaborative technology can support the development of a community of inquiry for the social construction of knowledge in a community of inquiry.
- Need to be aware of disparities in access to technology to ensure all learners have the opportunity to engage equally using transformative learning technology.