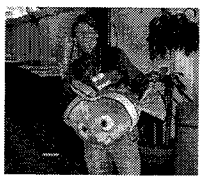
Part II. E-Learning and Instructional Design



Dr. Curtis J. Bonk
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President, SurveyShare, Inc.
http://php.indiana.edu/~cjbonk
cjbonk@indiana.edu

Reflection #1

- What are 2-3 key instructional design principles for e-learning?

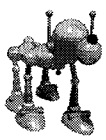
Poll #1. Which constructivistic strategy might like to try?

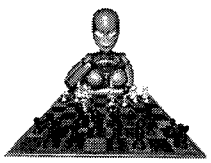
A. Learners work in virtual teams
B. Learners in a community of practice
C. Learners mentor or give feedback to each other on their work?
D. Use online mentors, experts, and coaches
E. Rely on instant messaging and chat

What led me to the promised land of constructivism and distance learning?

Thinking Back 20 Years Ago

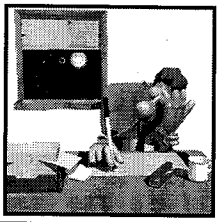
I thought I would Study Artificial Intelligence





Ah, the Excitement of Instructional Design!

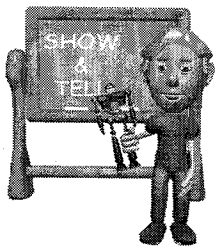
Ok, who is falling asleep at the mere mention of the phrase "instructional design?"



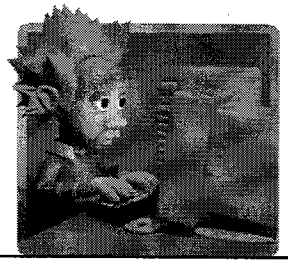
Of course, I was also studying psychology...

Ph. D.

And I minored in educational technology...



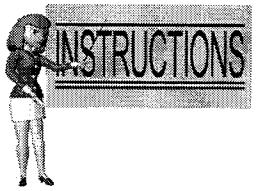
1. Instructional Philosophy and Approaches



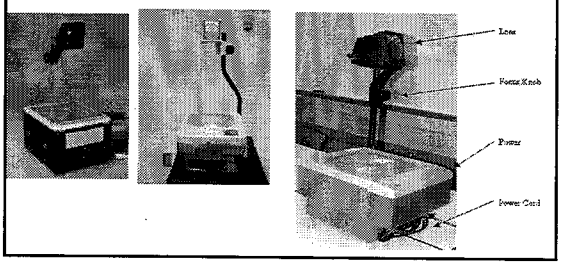
1. Instructional Philosophy and Approaches

- Decisions about approach (behavioral, constructivistic, inquiry)
- Must consider social context
- Build communities of practice (identity, respect, shared knowledge)
- Promote student centered or instructor-centered

Most ID Models in the 1980s Prescriptive

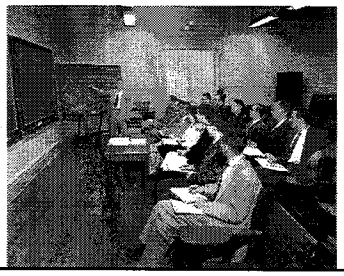


Teaching Technology of 20th Century (Overhead Projector)

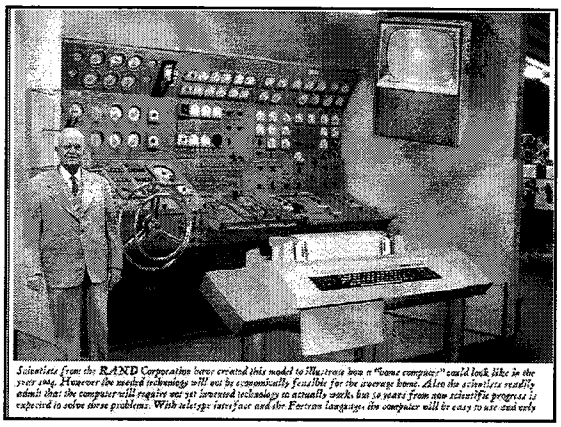


Teaching Technology of 1950

(Eric Hankam teaching the Watson Laboratory Three-Week Course on Computing, in Watson Laboratory, Columbia University, 612 West 116th Street, New York City, about 1950.)

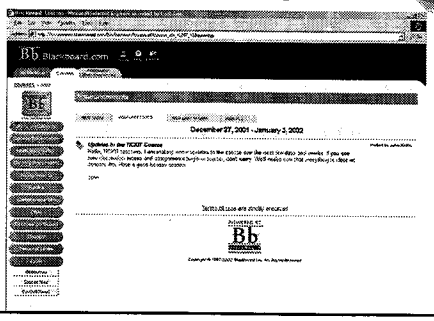


And, of course...there is digital video...

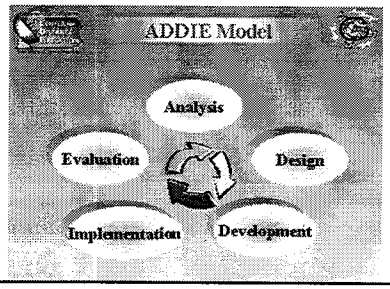


Scientists from the RAND Corporation have created this model to illustrate how a "home computer" could look like in the year 1984. However the needed technology will not be economically feasible for the average home. Also the scientists readily admit that the computer will require not yet invented technology to actually work, but in years from now scientific progress is expected to solve these problems. With selectype interface and the Fortran language, the computer will be easy to use and very

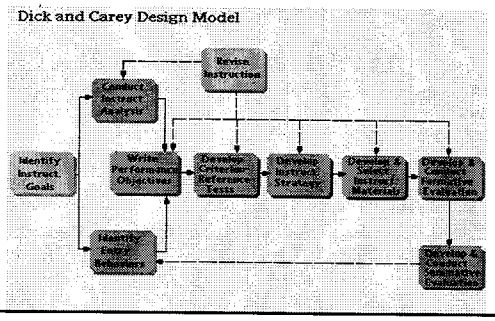
Pedagogical Course Management Systems?



ADDIE Model



Dick and Carey Design Model



Robert Gagne's 9 instructional events

gaining attention	show variety of computer generated triangles
informing learners of the objective	"What is an equilateral triangle?"
stimulating recall of prior learning	review definitions of triangles
presenting the stimulus	give definition of equilateral triangle
providing learning guidance	show example of how to create equilateral
eliciting performance	ask students to create 5 different examples
providing feedback	~~check all examples as correct/incorrect~~
assessing performance	provide scores and remediation
enhancing retention and transfer	show pictures of objects and ask students to identify equilaterals

From http://ip.psychology.org/gagne.html

Alan Collins, Professor Learning Sciences Inquiry Model

- **Collins' Cognitive Theory of Inquiry Teaching is a prescriptive model, primarily Socratic in nature, meaning that it relies upon a dialectic process of discussion, questions and answers that occurs between the learner and instructor. The process is guided in order to reach the predetermined objectives, which are described in this theory as teacher goals and subgoals. Ultimately, the learners will discover "how to learn".**

But Finally I Graduated

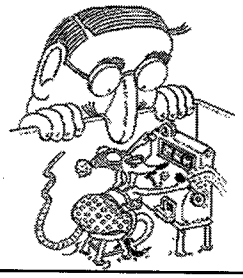
I met some behaviorists...

- **Behaviorism was a reaction to introspection, where each researcher served as his or her own research subject.**

Skinner (1904-1990) Quote.

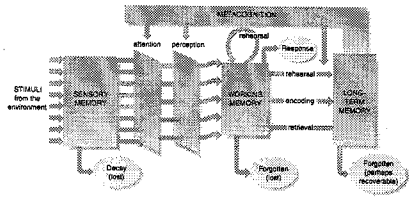
- I did not directly my life. I didn't design it. I never made decisions. Things always came up and made them for me. That's what life is.

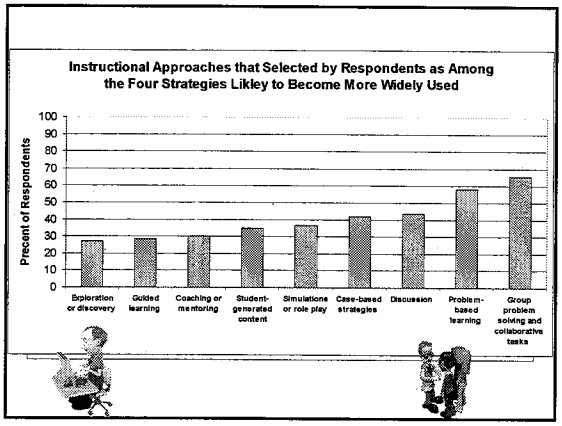
Behaviorist Interactivity



But I was not a behaviorist; despite being an accountant!

At first, I got interested in cognitive psychology





7 Fundamental Principles of Learning

(Ted Kahn, 1993; ted@differentways.org; President and CEO of DesignWorlds for Learning, Inc.)

1. Learning is social
2. Knowledge is integrated into life of community
3. Learning is an act of membership
4. Knowing in engagement in practice
5. Engagement & empowerment are linked
6. Failure to learn results from exclusion from practice
7. We have a society of lifelong learners

Learner-Centered Learning Principles

From American Psychological Association, 1997, http://www.apa.org/ed/lcp.html

Cognitive and Metacognitive Factors
1. Nature of the learning process
2. Goals of the learning process
3. Construction of knowledge
4. Strategic thinking
5. Thinking about thinking
6. Context of learning

Motivational and Affective Factors
7. Motivational and emotional influences
8. Intrinsic motivation to learn
9. Effects of motivation on effort

Developmental and Social Factors
10. Developmental influences on learning
11. Social influences on learning

Individual Differences
12. Individual differences in learning
13. Learning and diversity
14. Standards and assessment

Bentley (1991):

"A constructivist perspective is that students are pilgrims on a journey who participate actively in events and create meanings for themselves as a result of thought."

Constructivistic Teaching Principles (Brooks, 1990)

1. Build on student prior knowledge.
2. Make learning relevant.
3. Give students choice in learning activity.
4. Student autonomy & active lrng encouraged
5. Use of raw data sources & interactive materials
6. Encourage student dialogue
7. Seek elab on responses and justification
8. Pose contradictions to original hypothesis
9. Ask open-ended questions & allow wait time
10. Encourage reflection on experiences

Constructivism Emphasizes What?

- Learning not teaching
- Learner autonomy
- Learning is a process and how learn
- The context in which learning takes place
- Invention and trying out ideas
- Real world situations
- The role of experience in learning

Project-Based Learning (Blumenfeld, Soloway, et al.)

- Pursue nontrivial problems
- Ask and refine questions
- Debate issues
- Make predictions
- Collect and analyze data
- Draw conclusions
- Communicate ideas and findings
- Create artifacts

Problem- and Project-Based Learning (PBL)

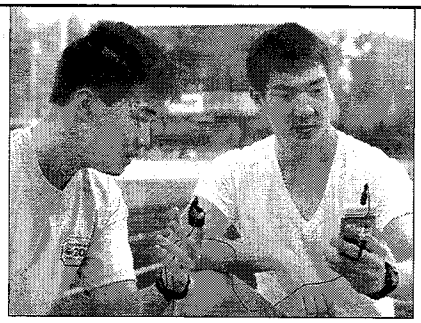
(Blumenfeld et al., 1991; Savery & Duffy, 1996)

1. Anchor in larger task or problem
2. Develop learner ownership over the problem
3. Design authentic tasks
4. Tasks should reflect real world complexity
5. Learners must own solution path/processes
6. Support and challenge learners
7. Encourage testing against alternative views
8. Encourage reflection on content and process
9. Novelty, Variety, Valued Problems, Choice

Product-Based Learning
(Blumenfeld, Soloway, et al.)

To produce something is the goal:

Announcement, Illustration, Advertisement, Flow Chart, Invention, Skit, Financial Report, Book, Venn Diagram, Colloquium, Conference, Documentary, Game, Exhibit, Speech Poster, Collage, Brochure, Time line, Drawing, Map. Graph, Report, Newsletter, Video, Letter, E-mail, Journal, Symposium



Duke University students Anthony Lau (left) and Vincent Mao read Lau's pulse using an Apple Computer iPod. As part of Duke's "Fundamentals of Digital Signal Processing" class, the pair of engineering majors use the iPods to record their heart rates before, during and after exercise.
Credit: Duke University (News.com)

Experiential Learning Issues: Academia and Local Community (Bowlin)
Advanced Cost Accounting

- **Develop cost-benefit analyses**
- **Establish budgeting system**
- **Flowchart processes and activities**
- **Develop job-costing system**
- **Develop activity rates for product costing**
- **Audit of real properties and operations**

Evidence of Knowing
(Bonk, 2005 Packet of Readings)

- **Providing examples and counterexamples**
- **Arranging arguments, evidence, and rebuttals**
- **Arguing critically and creatively**
- **Posing problems**
- **Solving ambiguous problems**
- **Explaining and extending knowledge**
- **Asking for help and helping others**
- **Good judgment, responsiveness, style**

Poll #2. Which constructivistic strategy might like to try?

A. Learners engage in online simulations, games, demos, and hands-on activities

B. Online surveys, polls, research, and authentic data collection

C. Extensive Web explorations.

D. Extensive Web support materials (papers, discussion forums, test examples)

E. Learners apply course content immediately on the job

Whose Learning Is It, Anyway?

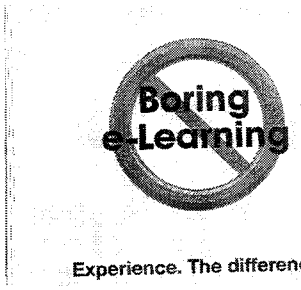
Learning & Training Innovations, Clay & Mindrum, July/August, 2003, p.33

"Companies need rich, compelling, targeted content that prompts learners to seize their responsibility to learn."

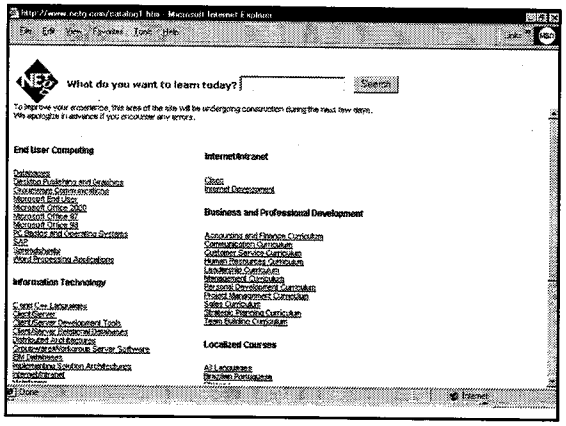
E-Learning: Harnessing the hype. Cohen & Payiatakis (2002, Feb). Performance Improvement, 41(7), 7-15.

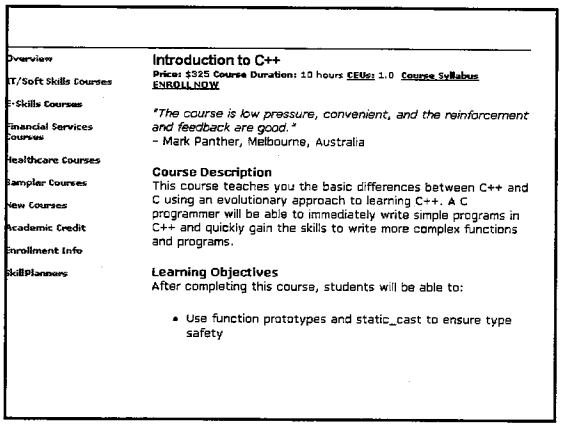
...both instructional and graphic (design)...must be compelling and engaging enough to keep the learner involved, interested, and stimulated...The ideal future is a learning experience designed to be memorable, motivational, and magical if it is to make a lasting impact on the capabilities of the learner.

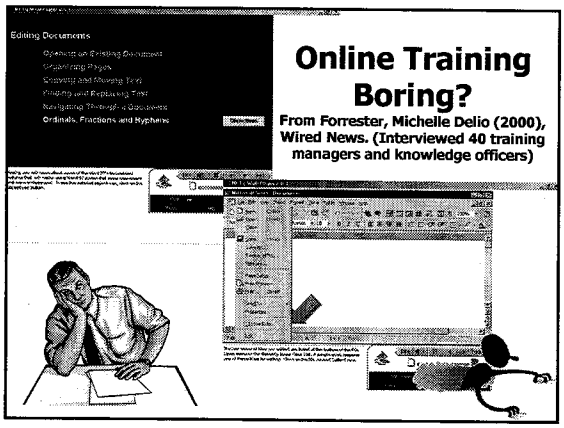
Instructional Design Process

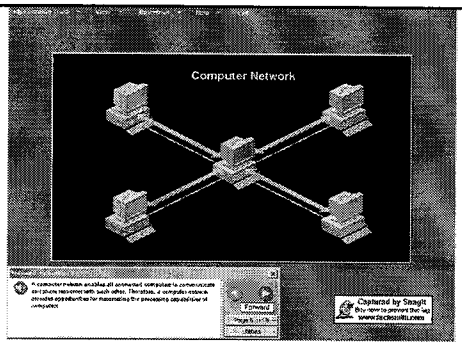


Experience. The difference.



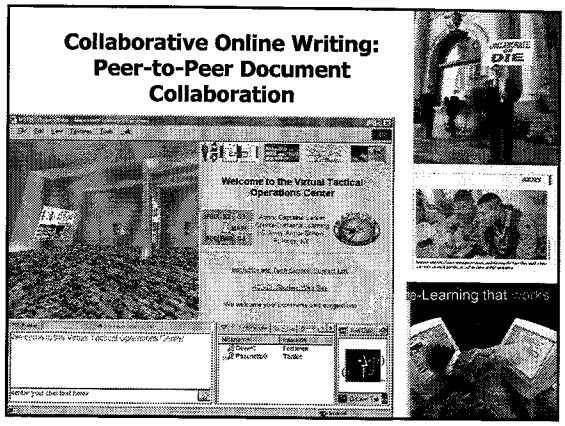






Online PowerPoint?

Collaborative Online Writing: Peer-to-Peer Document Collaboration



Online Performances

Whose Learning Is It, Anyway?

Learning & Training Innovations, Clay & Mindrum, July/August, 2003, p.33

"E-learning proponents promised just-in-time, just-for-me, anytime, anywhere, 24X7, interactive, streaming, real-time, asynchronous, pervasive, motivational, emotional, collaborative, multimedia, blended, adaptive, personalized, intuitive, rich, engaging, strategic, empowering, scalable, consistent, efficient, and cost-effective learning."

George Siemens (Sept 30, 2002, eLearnspace.org) Instructional Design in E-Learning

"Elearning is the marriage of technology and education, and most often, the instructional designer's greatest role is that of "bridging" concepts between the two worlds. This vital role ensures that a subject matter expert's (SME) concepts are properly developed by graphic designers and programmers."

George Siemens (Sept 30, 2002, eLearnspace.org) Instructional Design in E-Learning

"Unfortunately, the role of instructional design (ID) in elearning is often misunderstood - due to the perceived complexity of the process and to poor understanding of the pedagogical requirements of elearning. To a large degree, ID is the process whereby learning, not technology, is kept at the center of elearning development."

George Siemens
(Sept 30, 2002, eLearnspace.org)
Instructional Design in E-Learning

"Instructional Design is the systematic development of instructional specifications using learning and instructional theory to ensure the quality of instruction."

George Siemens
(Sept 30, 2002, eLearnspace.org)
Instructional Design in E-Learning

"It is the entire process of analysis of learning needs and goals and the development of a delivery system to meet those needs. It includes development of instructional materials and activities; and tryout and evaluation of all instruction and learner activities."

George Siemens
(Sept 30, 2002, eLearnspace.org)
Instructional Design in E-Learning

"In general, ID theory needs to move in the direction of flexibility and learner-empowerment if it is to allow ID to keep up with technological and institutional changes...."

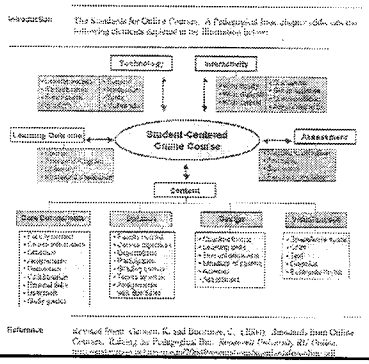
George Siemens
(Sept 30, 2002, eLearnspace.org)
Instructional Design in E-Learning

- ID focuses on the most effective way to present content
- ID begins with the learner and the learner experience

E-Learning Needs and Solutions (Kudos)

- A proven content development process
- Automated workflows
- Virtual, collaborative project management
- Experience with LMS
- Knowledge of standards
- Flexible organizational structure

Instructional Design is Systemic



Some Quality Benchmarks (ITT Technical Institute)

- Give learners some control over learning
- Develop activities that arouse learner interest
- Create challenging but achievable tasks
- Design activities for knowledge sharing
- Create activities for quality relationships among learners

Some Quality Benchmarks (ITT Technical Institute)

- Give purpose and clear expectations
- Allow learners to ask questions
- Make task relevant and meaningful
- Give clear & constructive feedback
- Provide links to advice from other distance learners

Course Analyses (Bonk, Kou, Lee, et al., 2005)

- Course info
- Course orientation
- Lesson presentation
- Instructional interaction (student-content, student-student, student-instructor)
- Instructional strategies
- Assessment strategies
- Locus of control

Six Elements of Effective e-Learning Design

(Brown & Voltz, 2005, IRRODL)

1. Activity
2. Scenario
3. Feedback
4. Delivery
5. Context
6. Impact
   - cover issues across all disciplines involved in e-learning design, but particularly focus on learning as the driving motivation

1. Activity

(Brown & Voltz, 2005, IRRODL)

1. Embed tasks that lead to understanding
2. Opportunities for student action rather than predefined tasks
3. Challenges lead to affordances
4. Involve learner in making choices
5. Make task clear and appropriate

2. Scenario

(Brown & Voltz, 2005, IRRODL)

1. Give reason or motivation to undertake activity; make it compelling
2. Provide interesting context– a story, role play, or situation
3. Uses humor, imagination, reward, drama, anticipation
4. Authentic and interesting

3. Feedback
(Brown & Voltz, 2005, IRRODL)

1. Timely and appropriate criticism
2. Reflective responses to questions
3. Shared comments on forums and blogs
4. Monitor progress in real time
5. Multiple avenues for feedback

4. Delivery
(Brown & Voltz, 2005, IRRODL)

1. There is tension between practical costs and access and learning activity requirements (media rich content, timely activities, etc.)
2. Maximize engagement, feedback, and reflection
3. Incorporate student voting or preferences for activities

5. Context
(Brown & Voltz, 2005, IRRODL)

1. Need to consider user profiles as well as technology infrastructure
2. Consider the institutional objectives
3. How does the activity fit within any sequence of learning

6. Influence
(Brown & Voltz, 2005, IRRODL)

1. How might the e-learning materials affect the learner
2. Extent impact people other than the learner; the broader community of the learner (work setting)
3. What is the cost-benefit
4. Impact on self-esteem

Malcolm Knowles (adult education expert)

Adult learners are self-directed

1. Adults need to be involved in the planning and evaluation of their instruction.
2. Experience (including mistakes) provides the basis for learning activities.
3. Adults are most interested in learning subjects that have immediate relevance to their job or personal life.
4. Adult learning is problem-centered rather than content-oriented.

On Demand Learning at IBM
(Rex Davenport, TD, May 2005)

- On Demand learning...based on roles in IBM...As an employee progresses through her work, the learning opportunities available to her via her screen change...We are making learning personalized.

On Demand Learning at IBM
(Rex Davenport, TD, May 2005)

- In a classic blended learning model, IBMers are exposed to courses that have been designed to involve a variety of approaches in a seamless combination, including web-based and face-to-face elements.

On Demand Learning at IBM
(DeViney & Lewis, in press)

- Breakthroughs, such as expertise locators, instant messaging and community tools can be applied to support teaming across boundaries of time, space and geography. If an organization creates a 'safe' environment where learners can share what they've learned, learning will also facilitate feedback into the organization, enabling a culture where the 'learner' contributes to institutional knowledge.

On Demand Learning at IBM
(DeViney & Lewis, in press)

- Enabling participation in shared (collaborative) problem-solving between the novice and the more experienced worker further facilitates individual, team and organizational capability growth and helps contextualize content. Local experts add a layer of understanding that converts the generic to the specific (Cross, 2003).

Blended Courses with Work-Based Activities
Collis (in press) Shell Oil

- In this context, authentic work-based activities are learning activities that are anchored in workplace practice and that are focussed on developing the participants' ability to solve problems in their everyday professional job roles (Merrill, 2002).

Key Steps in Design & Delivery
Collis (in press) Shell Oil

1. Begin course with measurable workplace gap
2. Design with multi-step work-based activity, not sequences of content
   a. Content is resource not the driver
3. Lead learners and supervisors to learning agreements for course
   a. Determine ending performance expectations; can it be measured?

Key Steps in Design & Delivery
Collis (in press) Shell Oil

4. Provide electronic workspace support for collaborative learning, discussion, participant submissions
5. Build peer interaction—informal knowledge sharing, expert contacts, reuse submissions
6. Embed different stakeholder evaluations—supervisor, expert, participant, instructor, ID'ers

Key Steps in Design & Delivery

Collis (in press) Shell Oil

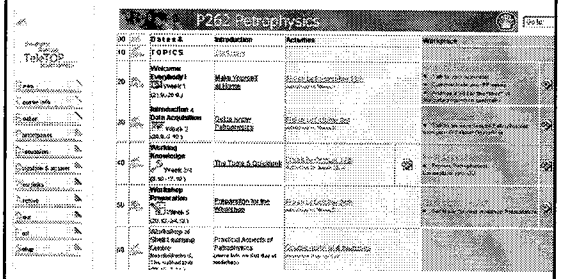
7. **Coach instructors and supervisors on how to plan and manage and take advantage of teachable moments**
8. **Reuse selected participant submissions**

Blended Courses with Work-Based Activities

Collis (in press) Shell Oil

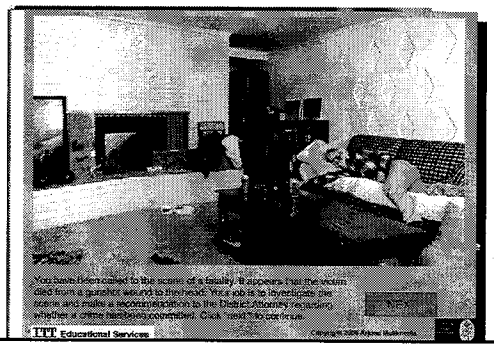
- **Orientation**
- **Collecting information from the workplace**
- **Product development**
- **Sharing and reflecting**
- **Comparing and contrasting**
- **Self-analysis**
- **Reflections**

Collis (in press) Shell Oil
Concepts introduced, activities presented, and then a workplace application occurs.

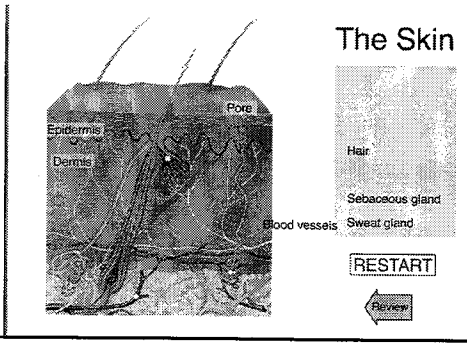


Sample Online Tools and Activities

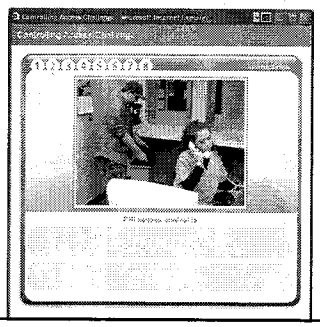
A Virtual Crime Scene



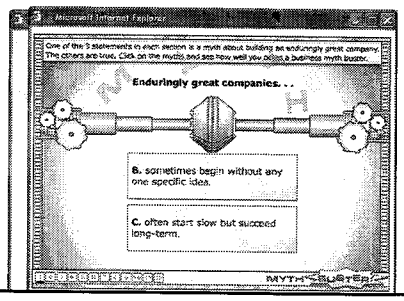
Learning Objects linked to learning styles & strategies in Bloom's Taxonomy (Arjuna Multimedia)



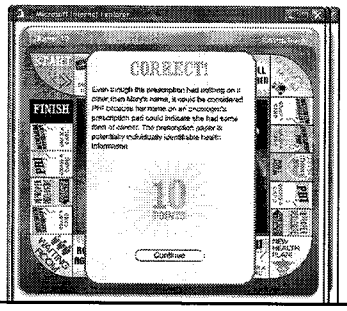
Learner Content Interaction:
Business & Healthcare Examples (Option 6)



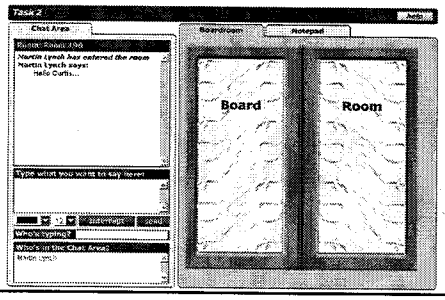
Learner-Content Interactions (UNext and Option 6)



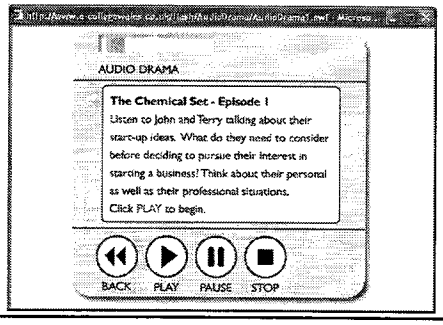
More Learner Content Interactions from Option 6



Business Class Simulated Boardroom Chat
eCollege Wales, Univ. of Glamorgan



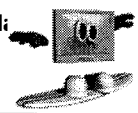
Audio Dramas
eCollege Wales, Univ. of Glamorgan



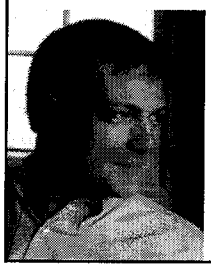
Simulations and Games

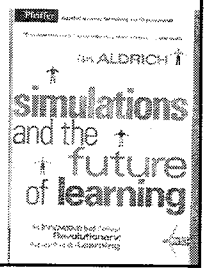
"There's something new on the horizon, though: computer-based soft skills simulations, which let learners practice skills such as negotiation and team building."

Clark Aldrich, The State of Simul: Sept. 2001, Online Learning

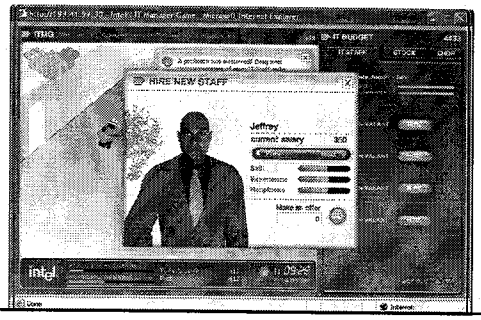


The Simu-gamé-story Market (Clark Aldrich)

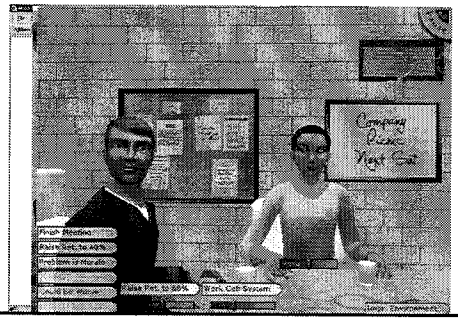




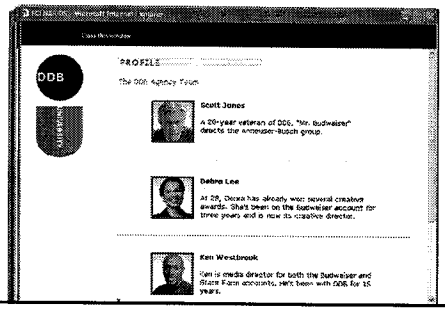
Intel IT Manager Game



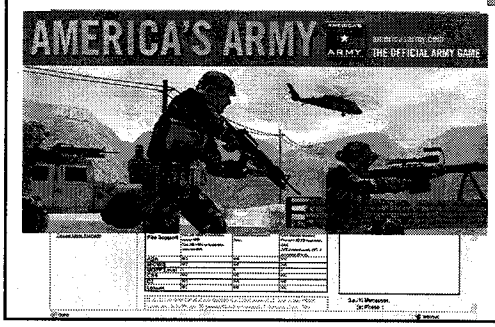
Business Simulations Examples



Time Revealed Scenario Learning (Wisdom Tools)



Army Simulation Example



Clark Aldrich, A Field Guide to Educational Simulations

- Branching Calculation Models Pros
  - Adaptive
  - You know how they got there, so can embed linear instructional content
  - Allows for more hand-holding
  - Can be cost effective
  - Consistency in assessment
  - Good for story telling
- Branching Calculation Models Cons
  - More of an assessment than an experience
  - Feels manipulative if can't do what want to do
  - Feels confined to set space

Clark Aldrich, A Field Guide to Educational Simulations

- Computer Graphics Pros
  - Easy to tweak
  - Taps creativity of user
  - Explores uncharted territory
  - Generalizes skills
  - Good for high level business skills
- Computer Graphics Cons
  - Expensive
  - Requires significant processing power
  - Skill base to produce is hard to find

Clark Aldrich, A Field Guide to Educational Simulations

- Video Based Pros
  - Lots of details, nuances, & specific behaviors
  - Feel serious and real
  - Over-forty people are used to TV
  - Works off dumb terminals
- Video Based Cons
  - Expensive
  - Huge bandwidth required
  - Interaction with video has delays
  - Hard to get just right
  - Hard to make small changes

Marty Siegel, IU Professor, and Founder of Wisdom Tools (May, 2003)

- Simulations are data driven. There's a model of behavior that underlies them, simulating some process or behavior.
- A simulation approximates reality. It is not reality.
- Simulations allow users to interact with characters or events or processes and see what happens.
- They're very interactive (most of the time) and can include sophisticated graphics.
- Many computer games employ simulation technology. MAXIS makes great games.

Simulation Issues

Clark Aldrich, A Field Guide to Educ Simulations

- Harder to evaluate simulation content—no ID theories
- Huge cultural shift from:
  - Just-enough, just-in-time, fast, relevant, bite-sized content
- Hard to know how much guidance to give learner
- SME and designers difficult to identify
- People may try beat to system rather than learn
- Bandwidth an issue; especially on multiplayer games
- Tough to evaluate what people learned
- No real standards

Strengths of Scenarios per Marty Siegel (May, 2003)

- They take little time to build
- They are (in comparison) cheap to build and implement; weeks vs. months (soon, even in days!)
- They follow a fixed path (some may see this as a flaw, but it's not); the designer controls the path experience; thus, important
- Paths are always experienced.
- Because they describe a reality, like a good novel, it can feel VERY realistic.

What are 3 key principles that you learned?