

E-Learning Curriculum Design and Delivery: Best Practices

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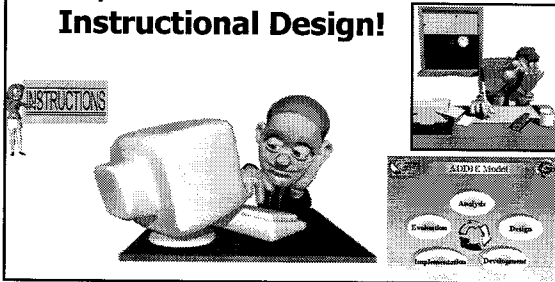


Best E-Learning Practices: Ten Key Areas

1. Instructional Design
2. Next Generation of Learners
3. Multimedia, Animations, and Dual Coding Theory
4. Interactivity
5. Motivation
6. Learning Styles
7. Blended Learning
8. Creating Learning Communities
9. Synchronous/Virtual Learning
10. Instructor Supports (facilitation/moderation skills)

1. Instructional Design

Ah, the Excitement of Instructional Design!



Instructional Philosophy and Approaches

- In 1986 it was about behavioral and prescriptive models
- In 2007 it is about constructivistic models, social context, inquiry, building communities of practice, promote learner-centered learning



Robert Gagne's 9 instructional events

gaining attention	show variety of examples
informing learners of the objective	generate examples
stimulating recall of prior learning	"What is an equivalent example?"
presenting the stimulus	review performance of examples
providing learning guidance	show definition of key concepts
eliciting performance	show example of how to create equivalent
providing feedback	ask students to create 5 different examples
assessing performance	check all examples for correct responses
enhancing retention and transfer	provide extra and immediate

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...."



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

I also started reading books on adult learning (e.g., Malcolm Knowles)

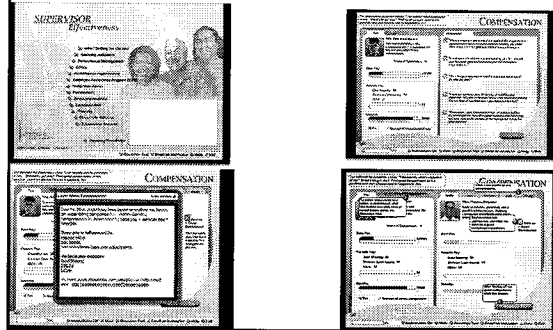
Adult learners are self-directed

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.

Performance-Based Learning (4 Components; Allen Interactions)

- **Meaningful context:** apply to job; creates framework and conditions
- **Challenge:** present a challenge and help
- **Meaningful feedback:** use feedback as a way to present content
- **Meaningful activities not passive**
- Customer service complaints; An animated production line producing poor quality; Increasing business losses; A simulated customer call; A medical prescription to be filled; A simulated electrical fault; A client record to be updated

Allen Interactions (HR Compensation example)



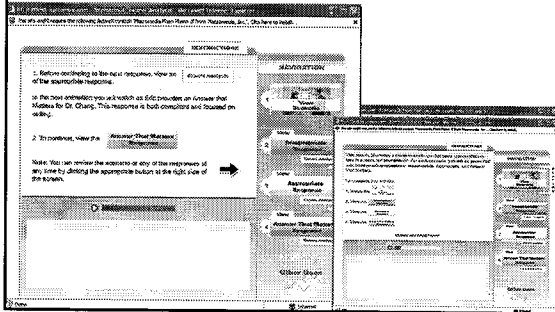
Performance Driven Learning (Option 6)

- **Solutions Centered:** Learning should help learners find solutions. We include extensive use of problem situations where learners explore issues, ideas, and practice real world skills.
- **Learner Focused:** We place foremost focus on the learners. We focus on what needs to be learned rather than what needs to be taught.
- **Context Driven:** We emphasize that learning must take place within meaningful, authentic conditions (also described as situated cognition).

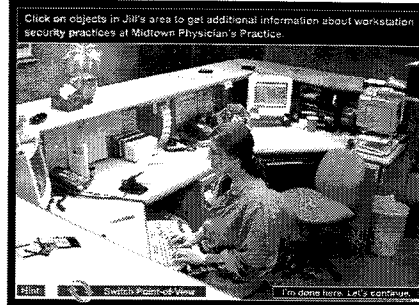
Performance Driven Learning (Option 6)

- **Flexibility:** Learning is rarely a linear process. We provide multiple ways for learners to access and proceed through the content.
- **Interactivity:** Learning requires interactivity—engaging the learner's mind with new perspectives—through questions, feedback, and simulations.
- **Effective:** Bottom-line, our courses are effective by focusing them on specific learning outcomes and then testing our courses with actual learners to see if those outcomes are achieved.

Video Scenario Learning (Option 6, Bloomington, IN)



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



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

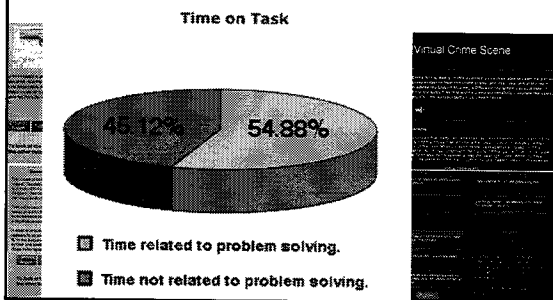
1. Activity

(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**

Video Scenario Learning (Option 6, Arjuna Multimedia, Bloomington, IN)

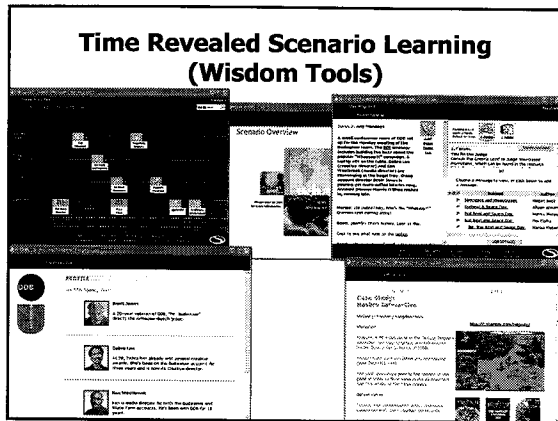
A comparison of average time on task when virtual crime scene is added.



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**



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.

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

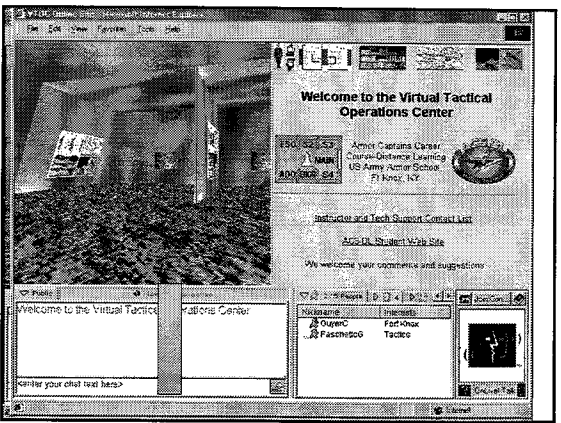
1. **Timely and appropriate criticism**
2. **Reflective responses to questions**
3. **Shared comments on forums and blogs**
4. **Monitor progress in real time**
5. **Multiple avenues for feedback**

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**

Async-Sync-FTF (Armor Captains Career Course)

- I. **Asynchronous Phase:** 240 hours of instruction or 1 year to complete; must score 70% or better on each gate exam
- II. **Synchronous Phase:** 60 hours of asynchronous and 120 hours of synchronous; Virtual Tactical Operations Center (VTOC) (7 rooms; 15 people/extension (chat, avatars, audio conferencing)
- III. **Residential Phase:** 120 hours of training in 2 weeks at Fort Knox



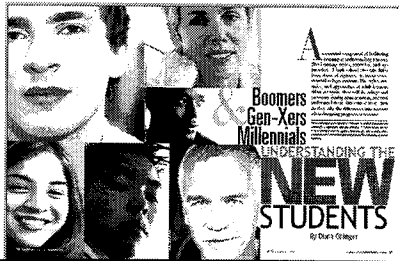
5. Context (Brown & Voltz, 2005, IRRODL)

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

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."

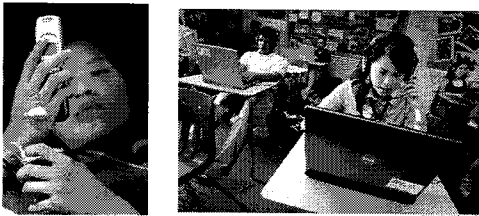
2. Next Generation of Learners



Next Generation of Students

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

Money
Generation Y: They've arrived at work with a new attitude
By Stephanie Armour, USA TODAY

Generation Y

New Data Show Distinct Skills Gap as Generation X Managers Replace Baby Boomers Minneapolis —

Feb. 9, 2007, Chief Learning Officer News

- 22.5 million baby boomers are on schedule to retire during the next 10 years
- The PDI "Pulse on Leaders" research surveyed the competencies of nearly 24,000 mid-level managers in 20 skill areas.
- Baby boomers higher ratings in 10 out of 18 competencies. More likely to know the business and to use technical or functional expertise on the job and their ability to coach and develop and their ability to manage execution.
- Gen X managers are more likely to receive higher ratings in self-development, work commitment, and analyzing issues than their older counterparts.



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

- 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_PDF9-29-06.pdf



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_PDF9-29-06.pdf

Generations: Dealing with Boomers, Gen-X, and Beyond

N. Boyce Appel, April 1, 2005, Practice Management Digest

Generalizations about Generations—Categorizations vs. Stereotypes

Generational Group	Born	Age	Stereotype
Silent Generation	1925 - 1942	61 - 78	Adaptive
Baby Boomers	1943 - 1960	43 - 60	Idealists
Thirteenth (Gen. X)	1961 - 1981	22 - 42	Reactive
Millennial (Gen. Y)	1982 - ?	13 - 21	Civic

Learner Control: Boomer

- The traditional instructor-focus is what is expected. The instructor determines what is important to learn and how it should be learned. Consistency and control are maintained with the "tell me, tell me, tell me" approach.

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)

Neomillennial 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

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)



3. Multimedia, Animations, and Dual Coding Theory

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

- Whose Learning Is It, Anyway? Learning & Training Innovations, Clay & Mindrum, July/August, 2003, p.33

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.

Verbal and Visual Systems

- The verbal system specializes in processing and storing linguistic information (words, sentences, etc.,). Information is stored in discrete, sequential units. In contrast, the visual system specializes in processing and storing image or 'picture-like' representations.

Cognitive Theory of Multimedia Learning

- Working memory includes independent auditory and visual working memories.
- Each working memory store has a limited capacity.
- Humans have separate systems for representing verbal and non-verbal information.
- Meaningful learning occurs when a learner selects relevant information in each store, organizes the information in each store into a coherent representation, and makes connections between corresponding representations in each store.
- Moreno & Mayer (2000)
- Multimedia instruction should be designed in such a way as to minimize cognitive load (Moreno & Mayer, 2003)

Seven Principles for the Use of Animation in Multimedia Instruction (Mayer & Moreno, 2002)

1. **The multimedia principle (present animation and narration rather than narration alone)**
2. **Spatial contiguity principle (present on-screen text near rather than far from corresponding animation)**
3. **Temporal contiguity principle (present corresponding animation and narration simultaneously rather than successively)**

Seven Principles for the Use of Animation in Multimedia Instruction (Mayer & Moreno, 2002)

4. **Coherence principle (exclude extraneous words, sounds, and video)**
5. **Modality principle (present animation and narration rather than animation and on-screen text)**
6. **Redundancy principle (present animation and narration rather than animation, narration, and on-screen text)**
7. **Personalization principle (present words in conversational rather than formal style)**

The promise of multimedia learning: Using the same instructional design methods across different media

Richard E. Mayer, *Learning and Instruction*, 13 (2003) 125-139.

A review of research on the design of multimedia explanations:

- (a) **a multimedia effect: in which students learn more deeply from words and pictures than from words alone—in both book-based and computer-based environments,**
- (b) **a coherence effect: in which students learn more deeply when extraneous material is excluded rather than included—in both book-based and computer-based environments,**

The promise of multimedia learning: using the same instructional design methods across different media

Richard E. Mayer, *Learning and Instruction*, 13 (2003) 125-139.

- (c) **a spatial contiguity effect: in which students learn more deeply when printed words are placed near rather than far from corresponding pictures—in both book-based and computer-based environments, and**
- (d) **a personalization effect: in which students learn more deeply when words are presented in conversational rather than formal style—both in computer-based environments containing spoken words and those using printed words.**

Animation Research

- **Rieber (1990) suggests that animations help with gaining attention, presentation, and practice**
- **Animations help emphasize important information (Hannafin & Peck, 1988)**
- **Attention-getting graphics help make relationships between ideas clear (Levin, Anglin, & Carney, 1987)**
- **Dynamic visual displays tend to be more effective than static (Park & Hopkins, 1993).**

The promise of multimedia learning: Using the same instructional design methods across different media

Richard E. Mayer, *Learning and Instruction*, 13 (2003) 125-139.

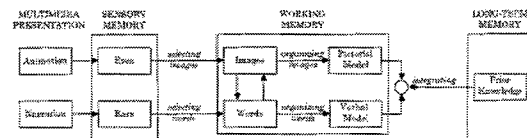


Fig. 1. A cognitive theory of multimedia learning.

Learning outcomes in online multimedia and lecture versions of intro computing course
(Kekkonen–Moneta & Moneta, 2002)

- Evaluated the effectiveness of Web–based, highly interactive, and multimedia–rich e–learning materials (learning outcomes in the lecture and online versions)
- 400+ college students in Hong Kong
- Both groups achieved comparable factual learning outcomes
- Online students outperformed the lecture students in applied–conceptual learning.

4. Interactivity



What is the Interaction Rationale?

(per Ellen Wagner, April, 2004)

- ☑ Interaction is the most debated construct in the world of technology mediated learning design and development.
- ☑ In these settings, interaction is the defining attribute of the quality and value
- ☑ Interactivity (equated with interaction) is the most expensive component of a technology mediated learning design.

February 22, 2007; "Training and eLearning Next: Insights from the ADL (Advanced Distributed Learning) Initiative, US Department of Defense"



Types of Interactions Possible?

(Moore, M. G. (1989). Editorial: Three types of interaction. *American Journal of Distance Education*, 3 (2), 1-7.)

1. Learner-Instructor
2. Learner-Learner
3. Learner-Content



-
- 4a. Learner-Self: highlighted the importance of 'self talking', or internal dialogue when engaging with learning materials (Soo & Bonk, 1998)
 - 4b. Learner-Interface: The learner's ability to use the communication medium facilitating the online course (Hillman, Willis, & Gunawardena, 1994)

Matrix of Web Interactions

(Cummings, Bonk, & Jacobs, 2002, *Internet in Higher Ed*)

Instructor to Student: Syllabus, notes, feedback.

to Instructor: Course resources, syllabi, notes.

to Practitioner: Tutorials, articles, news.

Student to Student: Comments, sample work, links.

to Instructor: Votes, tests, papers, evals.

to Practitioner: Web links, resumes, reflections

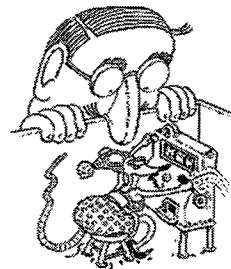
Practitioner to Student: Internships, jobs, e-fieldtrips

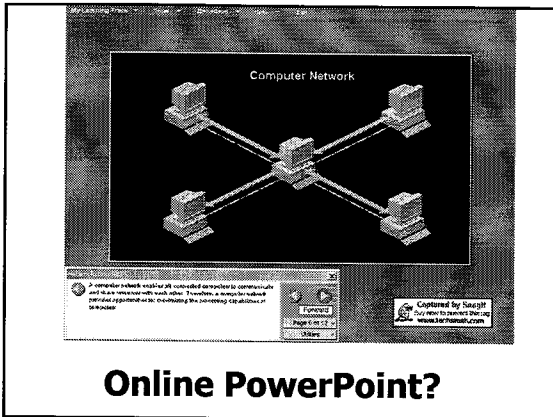
to Instructor: Opinion surveys, fdbk, listservs

to Practitioner: Forums, listservs, prof devel.



Behaviorist Interactivity







Designing Interaction/Interactivity

- Multiple types of interactions (Moore)
- Learners need templates, models, guides
- Feedback/responsiveness key
- Build teaming & collaboration
- Reflection & dialogue build knowledge
- Build consistency in design of resources
- Outcomes of interaction (Wagner)
- Simulations & games increasingly impmt

What are the Design Considerations for Learner Interaction???

(Insung Jung, 2003, Handbook of Distance Education, Moore & Anderson (Eds.))



- Multiple layers of online content & resources
- Increase social presence & interpersonal interaction
- Embed different types of interactions with detailed guidelines and good topics
- Provide quick and frequent feedback
- Include visual layouts where possible
- Allow flexible course structure

Interaction with Classmates

(Karen Swan (2004) cites Charlotte Gunawardena)




- Design community building activities
- Build trust in initial activities
- Encourage sharing in discussions
- Train faculty about social presence and instructor immediacy
- Model and encourage verbal immediacy
- Require discussion summaries that identify steps in knowledge creation

Interaction with Instructors

(Karen Swan (2004) cites Peter Shea)

- Provide frequent public and private interactions with students.
- Establish clear expectations for instructor-student interactions
- Provide timely and supportive feedback
- Automate testing and feedback where possible
- Include in faculty development

Interactivity Online

- Animations in small files (Macromedia (Adobe) Flash)
- Capture desktop activities (Matchware Screencorder)
- Collaborative writing (Writely.com, Jotspot)
- Desktop audio recordings (Audacity; iLife)
- Group Forums (Yahoo! Groups, Google Groups)
- Instant Messaging (AIM, MSN, Yahoo!)
- Noncollaborative writing (Blogger, Pitas)
- Photo Storage (Flickr)
- PP Slides with animation and narration (Articulate)
- VoIP (Skype and Google Talk) voice and text
- Web meetings (Ivisit)
- Wikis (PB Wiki, MediaWiki)

