CENTER FOR TEXTUAL STUDIES AND
DIGITAL HUMANITIES

DIGH 402 - Instructional Design and e-Learning

Spring Semester 2014

Week 14 - Extra

Building your e-Learning framework

Partner activities for the learner

- synchronous activities such as
    - role playing
    - question and answer sessions
- asynchronous activities such as
    - peer editing
    - peer review and assessment
    - 'buddy' roles

Building your e-Learning framework

Team or Group activities for learners

- group activities can be completed in a small group or team
- synchronous and asynchronous activities such as
    - online study groups
    - group based research
    - collaborative concept mapping and management
    - group discussions and debates
    - ranking and incentive system
    ...

Building your e-Learning framework

Class activities for learners

- synchronous
    - guest lecturers and speakers
    - 'Muddiest Point' exercise
    - discussion summary
    - games and simulations
- asynchronous
    - structured debates and controversies
    - summaries
    - critical incidents
    - scenarios and case studies

Building your e-Learning framework

Class activities for learners - 'critical incidents'

- specific situation where a person is actually involved where the problem is at hand
- useful as they help to avoid generalisations
- different incidents lead to different insights and interpretations
- critical incidents within the class
- also beneficial to broaden to examples from beyond the class
    - research or interviews...
- broad surveys and interviews can lead to groupings and loose classifications for reference within the class

Games and simulations

changing the brain game

"The immense amount of time spent with games during a child's formative years has led them to be literally 'hardwired' in a different way that those who came before"

Carstens, A., and Beck, J. 2005. "Get ready for the gamer generation." Tech Trends 49. PP.22-25.

"Immense changes in technology over the past thirty years, of which video games are a major part, have dramatically and discontinuously changed the way those people raised in this time period think, learn, and process information...The change has been so enormous that today's younger people have, in their intellectual style and preferences, very different minds from their parents and, in fact, all preceding generations"

Prensky, M. 2001. "Digital game-based learning." McGraw-Hill. P.17.

Games and simulations

changing the brain game

Prensky (2001) recommends,

- fast-paced to exploit 'twitch speed' information processing capabilities
- emphasis on high learner control and multiple tracks
    - leverage greater multitasking abilities
- actively engage participants
    - highly visual environments
    - encourage learning by exploration

Games and simulations

what are simulations?

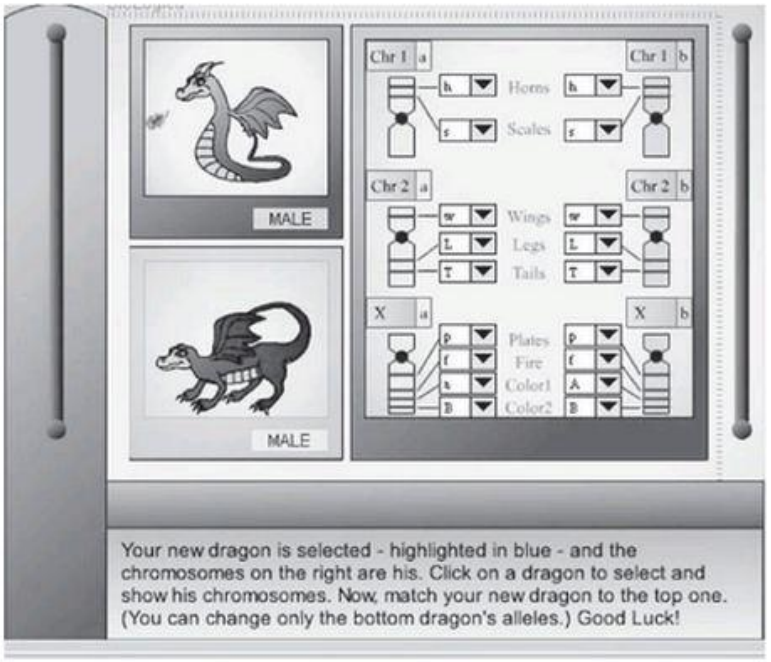
- linear interactive tutorial versus a simulation
- model of a real world system
    - respond in dynamic and rule-based ways to user responses
- two basic types of simulation
    - operational and conceptual
- operational primarily used to teach procedural skills
- conceptual simulations

Games and simulations

what are games?

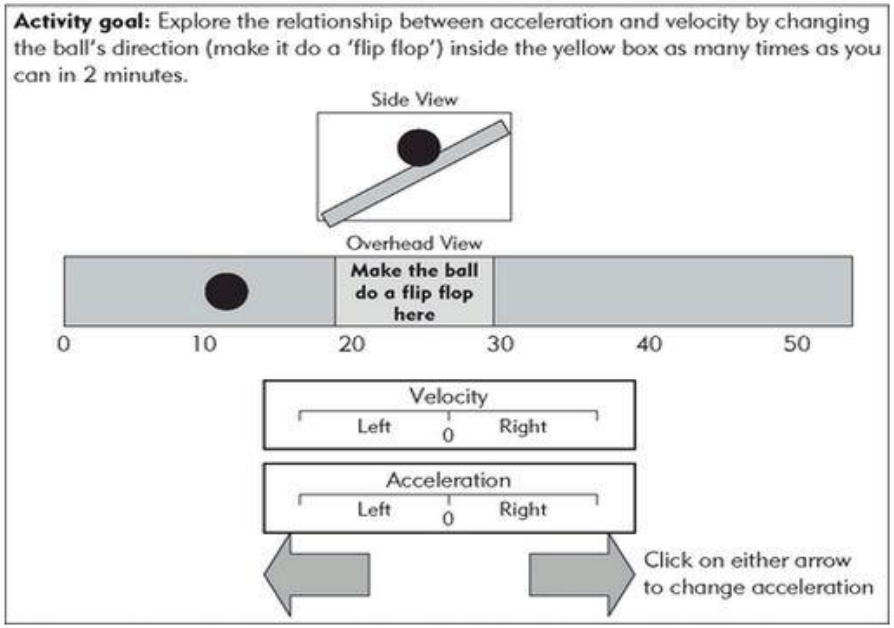
- online games include a broad array of formats and features
- common elements such as
    - competitive activity with a challenge and goal
    - set of rules and constraints
    - specific context

http://biologica.concord.org



Games and simulations

do they actually teach?



Rieber, L.P. 2005. "Multimedia learning in games, simulations, and microworlds." The Cambridge handbook of multimedia learning. Cambridge University Press.

Hays, R.T. 2005. "The effectiveness of instructional games: A literature review and discussion." Technical Report 2005-004. Washington.

Games and simulations

match game to learning goal

- Strategy, Family, Role Play, Adventure, Other...
    - Entertainment Software Association
- effective games and simulations for e-Learning should align features, goals...with desired instructional outcome
- Oregon Trail games appropriated by children
- Physics game counter-productive to the given physics principles

"Jeopardy-style games, a staple of games in the classroom, are likely to be best for promoting the learning of verbal information (facts, labels, and propositions) and concrete concepts. Arcade-style games..." (P.22)

Van Eck, R.N. 2006. "Digital game-based learning." Educause Review 41. PP.17-30.

Games and simulations

learning and game characteristics - guidance

- simulations and games that offer structure and sound learning support
- instructional explanations
- consideration and reflection on instructional content
- manage complexity
- offer instructional support

Games and simulations

learning and game characteristics - explanations

- provide explanatory feedback instead of corrective only feedback
- try to provide brief instructional explanations between breaks in a simulation

Issenberg, S.B., McGaghie, W.C., Petrusa, E.R., Gordon, D.L., and Scalese, R.J. 2005. "Features and uses of high fidelity medical simulations that lead to effective learning." Medical Teacher 27. PP. 10-29.

Moreno, R. 2004. "Decreasing cognitive load for novice students: Effects of explanatory versus corrective feedback in discovery-based multimedia." Instructional Science 32. PP. 99-113.

Games and simulations

learning and game characteristics - consideration and reflection

- achieving game goals or mastery of a simulation may preclude reflection
- reflection needed to abstract lessons and learning from a game or simulation

"The experiential nature of an educational simulation is very compelling - users often become very active and engaged in a simulation, similar to the experience of playing a video game. However, the intense and demanding interactivity of many simulations may not provide adequate time for the user to carefully reflect on the principles being modeled by the simulation"

Rieber, L.P., Tzeng, S.C., and Tribble, K. 2004. "Discovery learning, representation, and explanation within a computer-based simulation: Finding the right mix." Learning and Instruction 14. PP.307-323.

"reflection alone does not foster deeper learning unless it is based on correct information" P.127.

Moreno, R., and Mayer, R.E. 2005. "Role of guidance, reflection, and interactivity in an agent-based multimedia game." Journal of Educational Psychology 97. PP.117-128.

Games and simulations

learning and game characteristics - managing complexity

- multimedia principles to help avoid mental overload
- segmenting and sequencing content to reduce cognitive load and improve learning
- ways to manage mental load in games
    - manage complexity of the simulation or goal of the game
    - optimise the complexity of the interface
    - provide instructional support such as memory aids or activity guidance

Games and simulations

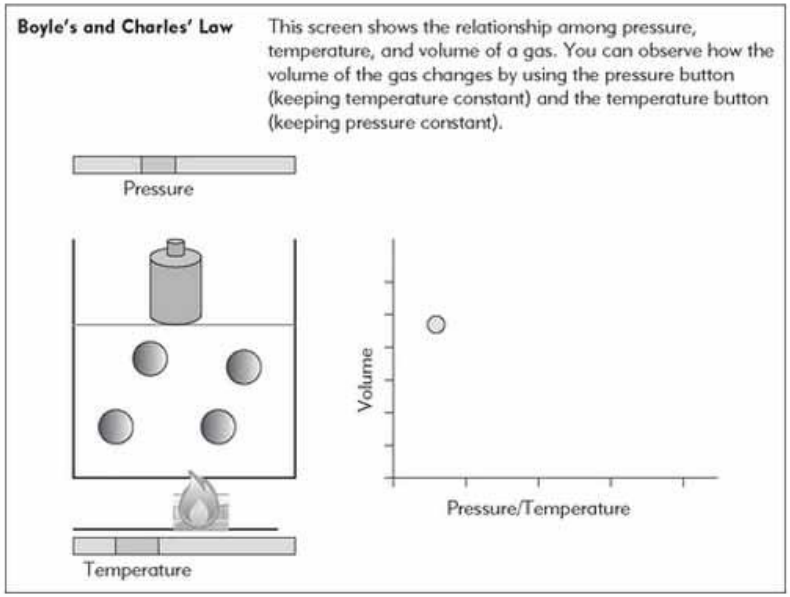
learning and game characteristics - managing complexity (goal progression)

- start with a relatively easy task or goal
- move gradually to more complex environments
- consider options to allow a user to manage their level of complexity
- consider learner, and gamer, experience levels
- dynamically adapt game complexity based on accuracy of learner responses

Games and simulations

learning and game characteristics - managing complexity (interface complexity)

- function of the type and display of images in a game or simulation
- simulation of Boyles and Charles laws
    - Lee, H., Plass, J.L., and Homer, B.C. 2006. "Optimizing cognitive load for learning from computer-based science simulations." Journal of Educational Psychology 98. PP. 902-913.
    - combined interface
    - separated interface
    - abstract interface
    - concrete interface



Games and simulations

learning and game characteristics - managing complexity (interface complexity - part 2)

"for novice learners, a high-fidelity task environment often contains irrelevant details that may deteriorate learning" P.79.

- Van Merrienboer, J.J.G., and Kester, L. 2005. "The four-component instructional design model: Multimedia principles in environments for complex learning." The Cambridge handbook of multimedia learning. Cambridge University Press.

- Norman, G.R. 2005. "Inverting the pyramid." Advances in Health Sciences Education 10. PP. 85-88.

Games and simulations

learning and game characteristics - managing complexity (other options)

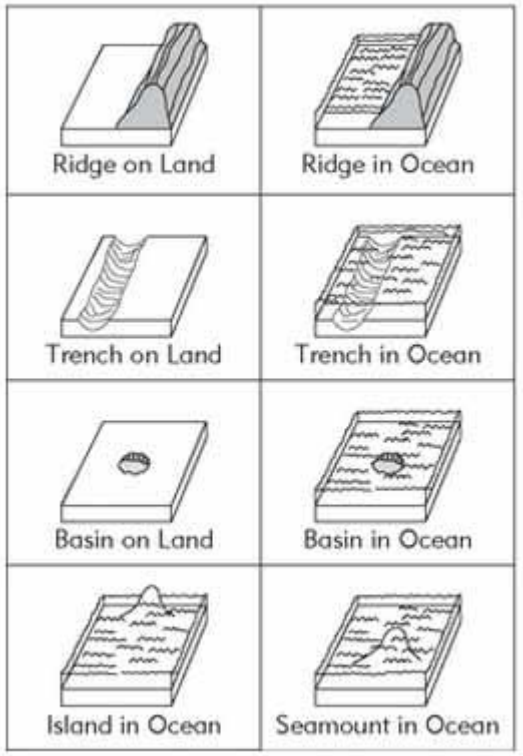
- "training wheels" principle for software simulations
    - Carroll, J.M. 2000. "Making use: Scenario-based design of human-computer interactions." MIT Press.
- faded worked examples
- pacing of game or simulation
    - Mayer, R.E., and Jackson, J. 2005. "The case for coherence in scientific explanations: Quantitative details can hurt qualitative understanding." Journal of Experimental Psychology: Applied 11. PP. 13-18.

Games and simulations

learning and game characteristics - instructional support

- instruction in game playing
- provide memory support
- process guidance
- visualisation support

"students need support in how to interact with geology simulations, particularly support in building and using spatial representations" P.181.
- Mayer, R.E., Mautone, P., and Prothero, W. 2002. "Pictorial aids for learning by doing in a multimedia geology simulation game."
Journal of Educational Psychology 94. PP.171-185.



Games and simulations

a few parting considerations...

- guidance
    - format, source, timing, types per instructional goals...
- simulation and game taxonomies
    - taxonomy matching to different learning outcomes, game formats aligned to best-fit learning outcomes...
- cost-benefit of games and simulations
    - efficiencies of games, comparison with other formats and mediums, motivational benefits...
- suitability of games
    - who prefers games?, pilot programs to test suitability...
- effective interfaces
    - effective representation of the interface, the feedback, support...
- level of interactivity
- simulation or game?