# New Students, New Learning

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# Two Themes…

- What is quality in e-learning?
  - What is quality?
  - How do we achieve it?
  - How do we measure for it?
- Who is the new student?
  - What makes today's students different?
  - How do we teach them?

# 1. Some Preliminaries

- What counts as quality depends on what you're trying to do, your objectives…
- What are the objectives of e-learning? Of learning?
- That depends on who you ask…

# Why Learning?

- The content view… amassing a set of basic skills and knowledge
- The economic view… preparing people for gainful employment
- The values view… fostering a certain set of cultural and moral values

# Why Learning (2)

My own view…

1. Learning cannot be subsumed to the values of a certain sector in society (Rousseau)
2. The best expression of the social good is through individual good… to pursue one's own good in one's own way (Mill)

# What This Amounts To…

- The evaluation of learning should be on a society-wide basis
- It should be framed from the point of view of individual aspirations
- It should be measured in terms of capacities rather than content – how well a student can negotiate a diverse, changing, information-rich culture

# 2. Evaluating E-Learning

- The objective: show e-learning is…
  - More effective than traditional learning
  - More efficient than traditional learning
- Three approaches
  - Test for outcomes
  - Identify best practices
  - Measure usage

# Measuring Results

- The Campbell Collaboration
  - Drawn from the Cochrane Collaboration in medicine http://www.cochrane.org/
  - Empirical studies which measure the impact of a single variable or intervention
  - Scientific methodology – controlled conditions, double-blind
- Works (maybe) for normal science (Kuhn)

# The Changing Landscape

- E-learning is new, the tools are under-developed, not being used (McFarlane)
- The objectives have shifted – from a narrow definition of quality to a wider view that includes, eg., accessibility (note the impact of accessibility on test scores)
- The impact extends beyond the domain – how do we cure war? Poverty?

# 3. New Student, New Media

- The media environment has changed…
- Consider choice…
  - It's a 600-channel TV universe.
  - It's a 10,000 station radio universe.
  - It's an 8,000,000,000 plus page Internet.
- Media is ubiquitous – remember when we would 'go' to the the library, the reading room, the TV room, the school…?

# The Pace Has Changed

- Students today operate on what is called ‘twitch speed’
- They expect instantaneous access to information, day or night
- They expect to be able to communication with anyone at any time

# Access is a Given

- Students today expect, want and need tools that provide hyperlinks, instantaneous random access to everyone and everything
- They expect access to be a feature of their environment, through mobile phones and PDAs, wireless access, smart devices…
- The catchphrase is ‘instant gratification’ – but that doesn’t capture it – it’s more like, ‘why the wait?’

# A Matter of Influence…

- Richard Saul Wurman, *Information Anxiety,* estimates that today's college grads have spent:
  - 10,000 hours playing video games, 20,000 hours watching TV, 20,000 hours talking on the phone
  - Countless hours listening to music, surfing the Web, using Instant Messenger, chat rooms and email
  - 5,000 hours reading, 11,000 hours attending school.

# Values? What Values?

- “Today’s kid’s values are not and will not be inculcated by the family, the church or other institutions in either the present or the future. They are and will continue to be developed by the electronic and visual media. This is where they will learn many of their social skills as they’ve become increasingly immersed in the new digital landscape.”

# 4. Learning in Context

- So let's look at what we are doing…
- Learning, both online and off…
  - Is segregated from other activities
  - Is synchronous, time-based, limited
  - Is offered in a structured, linear form (consider the design of WebCT, Blackboard)
  - Is predominately content-based

# Irrelevant?

- Not quite… but almost
- One would expect that outcomes are almost completely unrelated to schools, and the results bear this out…
  - In the U.S., the major determinate of learning is nutrition (especially in early years)
  - Australia study just released – outcomes almost completely determined by socio-economic background www.dpc.vic.gov.au/SharedFuture

# Disconnect?

- “It’s becoming increasingly evident that there is a fundamental disconnect between the way kids think, learn, and communicate and the ways that schools interact with them.” - Jukes and Dosaj
- So… how do they learn?

# Intermission

# 5. The MTV Mindset?

- Two major features of what is being called ‘the MTV Mindset’ …
  - Emphasis on the spatial, visual
  - Multitasking – parallel processing – multithreading
- Sounds and visual (and sometimes text, see esp. Van Halen, *Right Now*) being presented as a single entity

# It’s All Just 1s and 0s

- Because they’ve grown up with not just text-based information, but also images, sounds, and video presented as a single entity, this generation has developed an MTV mindset. For them, this isn’t multimedia. As David Thornburg suggests, it’s monomedia – it’s all just digital 0’s and 1’s and delivered by a single device.” - Jukes and Dosaj

# A Single Experience

- Hebbian plasticity – when two neural events happen simultaneously, they begin to be thought of as a single event (LeDoux, p. 136)
- Though visual, audio and other senses, are input separately, they are quickly combined at both a sub-cognitive level (amygdala) and cognitive (polymodal cortex) level (LeDoux, p. 207)

# The Weight of Experience

- Neuroplasticity is a slow process
- Brains don't just change immediately, this is a process that takes time
- What we're talking about here is several hours a day, 7 days a week. For example, learning to read and write required our brains to be reprogrammed over extended periods of time - several hours a day, 7 days a week." - Jukes and Dosaj

# Use It or Lose It

- Neural ciurcuits are constantly strengthened or weakened based on their inputs – can be described (possibly inaccurately) as Darwinian selection – use it or lose it
- "Native learners prefer receiving info quickly from multiple multimedia sources while many teachers prefer slow and controlled release of info from limited sources." - Jukes and Dosaj

# 6. The Language of Thought

- Cognitive theorists (Chomsky, Fodor, et.al.) tell us there is a ‘language of thought’
- There is no doubt that as experience is processed, it is compared to a set of pre-existing mental concepts
- But… though our capacities are innate, the nature of this processing is changed by experience

# Left Brain, Right Brain

- It is overly simplistic, but there is truth to the idea that there are two major modes of thought
- Language gives us capacities… it "alters the brain's capacity to compare, contrast, discriminate and associate on-line, in real time…" (LeDoux, p. 197)
- But this capacity is now being *merged* with non-linguistic modes of thought

# Content

- Composition: the whole is greater than the parts – bricks, atoms, pixels
- The content is not contained in the parts, it *emerges* from the combination of the parts
- The use of multimedia consists not in stringing it together, like a narrative, but in arranging them, like (a painting, an orchestra, a sand castle, … )

# Example: Classification

- Classification is a classic example. What is the *topic* of a learning object? That depends on which classification scheme you use…
- Is this a picture of:
  - Hands?
  - Lines?
  - A runner?
  - Start position?
  - Vagueness?

# Learning Content

- People should stop thinking of learning as though it were classes or lessons or some such thing with built-in intent
- It is preferable to think of it as a greatly enhanced vocabulary that can be used in a multidimensional (as opposed to merely linear) language

# 7. The Grammar of Learning

- “Music, the Internet, and even TV… all on a fridge” (sign on a Canberra bus)
- “For knowledge to really "stick," students need to consistently have experiences where they discover information and then synthesize that into new knowledge by applying it to what they have previously understood to "construct" their own understanding of the world.” - Jukes and Dosaj

# Characteristics of the Language

- Two major differences from text-based language:

1. Transmission → Immersion
2. Description → Experience

- Words are abstractions, pale reflections of a much deeper experience (hence, eg., tacit knowledge…)

# Structure of the Language

- Old: objects are placed in a sequence with (maybe) limited branching – limited choices, need for uniformity, static, single focus
- New: objects are placed in an environment – multiple choices, room for diversity, dynamic, multiple points of focus

# The Wider Context

- Linear → Multi-threaded
- Content Delivery → immersive, interactive
- Static, paced → dynamic, unpaced
- Demonstration → inference
- Learning objectives → learner goals
- Motivation → desire

# 8. Learning Environments

- The attempt to organize bits of instruction into neatly packaged courses is a mistake
- The use of learning objects is best characterized as placing (access to) objects in an environment
- The design of the environment consists in the creation of a context of use

# Types of Learning Environment

- Simulation or artificial environment, such as a game
- Multi-threaded stream of discourse, such as a blog or newsletter
- Dynamic interactive knowledge base such as a wiki
- Embedded learning, such as workplace support, smart artifacts

# The Integrated Environment

- Like the student's desktop, only more so
- Provides access to tools (simulations, blogs, wiki, support)
- Is itself immersed in some wider real-life context or environment
- Learning occurs in the real world, learning design supports this learning

# Example from Melbourne

- Kirsty Baird – *Street Survivor* (‘Win for teens on the streets’, The Australian, Sept 15, 2004, p. 26)
- A video game, that mirrors the experiences of homeless youngsters
  - A drug in the game, called ‘Quick’
  - Players manage health, habit, esteem
  - Connected to real world, eg., addresses of food vans correspond to real world locations

# The Theory…

- "Effective learners build mental models. Mental models are the categories and interrelationships SIS and STM use to refine and store the information gleaned from the experiences and information they encounter in LTM. Effective learners constantly challenge the accuracy and robustness of their mental models and adapt them when necessary to accommodate new data …" - Jukes and Dosaj

# 9. Back to Quality…

- The Proposal in a Nutshell
  - Describe learning resources using metadata
  - Harvest metadata from various repositories
  - Develop LO evaluation metadata format
  - Employ evaluation results in search process

# Asking the Right Questions

- Are we evaluating the right thing?

Courses and classes? Vs people and resources…

- Is it being done at the right time?

Before? After? A paradox here…

- Did we take the right point of view?

Completion rates? Grades? Vs performance, ROI, life success…

# The Principle of Quality

***How do you know this will be a good talk?***

Because, in the past:

- People like you…
- … expressed satisfaction…
- … with things like this

Three dimensions of quality assessment: **the item, the user, the rating** (the product, the customer, the`satisfaction)

# Previous Work

- Multimedia Educational Resource for Learning and Online Teaching (MERLOT) http://www.merlot.org
- Learning Object Review Instrument (LORI) http://www.elera.net/eLera/Home/About%20%20LORI/
- Various definitions of evaluation criteria
  - eg. DESIRE http://www.desire.org/handbook/2-1.html
  - Nesbit, et.al. http://www.cjlt.ca/content/vol28.3/nesbit_etal.html

# Issues (1)

***Issues (1)***

- The peer review process in MERLOT is too slow, creating a bottleneck
- Both MERLOT and LORI are centralized, so review information is not widely available
- Both MERLOT and LORI employ a single set of criteria – but different media require different criteria

# Issues (2)

***Issues (2)***

- Results are a single aggregation, but different types of user have different criteria
- In order to use the system for content retrieval, the object must be evaluated

# What We Want

- A method for determining how a learning resource will be appropriate for a certain use when it has never been seen or reviewed
- A system that collects and distributes learning resource evaluation metadata that associates quality with known properties of the resource (e.g., author, publisher, format, educational level)

# Recommender Systems

- "Collaborative filtering or recommender systems use a database about user preferences to predict additional topics or products a new user might like." (Breese, et.al., http://www.research.microsoft.com/users/breese/cfalgs.html)
- The idea is that associations are mapped between:
  - User profile – properties of given users
  - Resource profile – properties of the resource
  - Previous evaluations of other resources

(See also http://www.cs.umbc.edu/~ian/sigir99-rec/ and http://www.iota.org/Winter99/recommend.html )

# Some Recommender Systems…

- Firefly – used to recommend books, music – bought by Microsoft to create Passport
- Launch – created by Yahoo to allow users to rate and recommend music, proposes new selections, very commercial
- Match.com – allows users to input physical and psychological preferences, proposes matches

# 10. Evaluating Learning

- Development and definition of evaluative metadata
- Expanding evaluation schema to include user types with a set of relevant ratings at different levels of detail
- Quality evaluator for the assessment of perceived subjective quality of a learning object based on criteria specific to each type of object

# Our Approach

- Quality evaluator using LO type-specific evaluation criteria with rating summary or ‘report card’
  - information according to eight groups of LO users
  - weighted global rating
  - user-tailored weighting; user preferences of the evaluation quality criteria
- Combination of subjective quality values that are purposefully fuzzy

# Representing Evaluation Data

- Using the schemas defined, evaluation data is stored as XML files
- These XML files are aggregated alongside learning object metadata
- Evaluation data may then be aggregated or interpreted

# Types of Metadata

| First Person | Second Person | Third Person |
|---|---|---|
| - Bibliographic<br>- Technical<br>- Rights | - Educational<br>- Sequence and Relational<br>- Interaction | - Evaluation<br>- Classification |
| *Created by the content author or publisher* | *Created by the content user (in the process of use)* | *Created by disinterested third parties* |

# The User Profile

- user description data: required or available for the user to enter via sign-in forms for example:
  - user information: age, gender, occupation, education level…
  - user preferences: language, topics of interest, choice of media…
- automatically collected user data (user platform: OS, connection bandwidth …)

# Learning Resource Filtering

- Content filtering: based on content similarities (metadata-based) with other resources
- finding other users that exhibit similar rating patterns as the target user (called user neighborhood) by means of clustering algorithms
- recommending resources that have not been rated by target user according to their ratings by neighborhood users

# 11. The Theoretical Basis

- The ‘quality’ of a learning resource is directly related to meaningfulness
  - By ‘meaningfulness, I mean the capacity for it to be comprehended by the student
  - Similar (if pressed) to Anderson’s ‘presence’
- (Wittgenstein) Meaning is use
  - We know that the ‘words’ are being comprehended if they are being used

# Finale

- “If we truly want to make a difference in the lives of our children, schools must become a place where students are actively engaged in constructing their own knowledge… address essential questions and participate in the processes that make up intellectual accomplishment… an understandable purpose and a connection to the real world outside school.” - Jukes and Dosaj