Carmel McNaught

Enduring themes and new horizons for educational technology

http://vimeo.com/10134235
Role of a keynote speech

- to stir things up … which might overturn ideas & beliefs
- to explore some underlying assumptions & concepts
Outline

- Preliminary comments – literacies & evolving web technologies
- Complexity of eLearning & importance of prior experience shaping perceptions
- ‘Old’ multimedia projects → ideas of learning design and T&L models
- Ss’ and Ts’ perceptions of T&L and eLearning
- New opportunities
- Summary of themes

First, let’s begin with a little social media …
Shifts in geographical cultures

Shifts in disciplinary cultures
Is it such a shift?

Welcome to the Science Box

http://cdn3.ioffer.com/img/item/140/405/147/ViRp.jpg


http://cdn3.ioffer.com/img/item/140/405/147/ViRp.jpg

Thanks to Clayton R Wright
But what about this?
2010 Horizon Report: Critical challenges

- The role of the academy – and the way we prepare students for their future lives – is changing.

- New scholarly forms of authoring, publishing, and researching continue to emerge but appropriate metrics for evaluating them increasingly and far too often lag behind.

- Digital media literacy continues its rise in importance as a key skill in every discipline and profession.

- Institutions increasingly focus more narrowly on key goals, as a result of shrinking budgets in the present economic climate.

21st C Literacies

Visual Literacy
Cultural Literacy
Network Literacy
Global Literacy
Computer Literacy
Written Literacy
Media Literacy
Library Literacy
Linguistic Literacy

21ST CENTURY LITERACIES

After blogs.ubc.ca/dean/files/2009/02/bloom1.gif
Web 1.0
“the mostly read-only Web”
250,000 sites
published content
user generated content
45 million global users
1996

Web 2.0
“the wildly read-write Web”
80,000,000 sites
published content
user generated content
1 billion+ global users
2006

Web 3.0?
“the smart read-write Mobile Web”
interconnected
published content
user generated content

http://web2.socialcomputingmagazine.com/
2010 ...???
Media since ~1990

Web 1.0
Web 2.0
Semantic Web (3.0?)

A range of very different technologies: LMSs, mobile, virtual worlds, etc.


Email
Multimedia
Social media
Investigating eLearning …

- “… is interdisciplinary in that it seeks to combine and explore the interconnections between new and different approaches from different fields and specializations; it is multidisciplinary in that it simultaneously tries to respect the multiplicity of differences that can separate one research approach from another.” (Friesen, 2009, p. 12)

- So, we are not talking about simple stuff!
What have you experienced from this smorgasbord?

- online communities of learners, online communities of practice ... (lots of communities), classrooms without walls extending locally and globally, multimedia-enhanced games and simulations, computer-assisted interactive tutorials, just-in-time training, learning repositories, etc., etc. Additionally, now we are exploring virtual worlds, mobile technologies and a range of social media.
Essence and detail …

- You will see & hear different things in this talk depending on your T&L beliefs and your experience.
- Core principles are transferrable.
- Details? Maybe or maybe not …

http://tinyurl.com/2ffmbwh
Two multimedia projects

Both in use after 18 years.
Something must be right …

Note both projects were designed for students to work together – pairs or in small groups – interaction offline
interactivity
levels of help
little didactic material
use of visual material
wide range of materials
well evaluated

Two Peters and a Paul … et al.

https://chemcal.chemistry.unimelb.edu.au/MMindex.html
Circle all the asymmetric carbon centres in the product molecule.
Circle all the asymmetric carbon centres in the product molecule.
Stereochemical Configurations

**Hint:**
For a carbon centre to be asymmetric, it must have four different substituents. Which carbon centres are like this?

![Chemical structure](image)
**Hint:**
For a carbon centre to be asymmetric, it must have four different substituents. Which carbon centres are like this?

![Chemical Structure]

**Explaination:**
The two carbons in the middle of the molecule have four different substituents - an OH group, a hydrogen, a phenyl group (benzene ring), and a CHO(C₆H₅).

_Scaffolding_
Circle all the asymmetric carbon centres in the product molecule.
Now the product molecule is shown with full stereochemical detail. Assign the configuration of each centre as R or S.
Evaluation

Fitting the pieces together
Making sense of the whole picture

Data on T feelings
Teacher reflection (interviews, journals)

Data on Ss feelings
Student perceptions (surveys, focus groups)

Data on what Ss know
Student performance (projects, presentations, exams)

Data on what Ss do
Student actions (observation, log data)
Detailed evaluation: E.g. Visual mapping of computer logs

- focus on actual experience
- assisted students to reflect on their decisions
- brought up issues not thought of earlier
- valued by students

Fritze (1994)
Small digression

Let’s consider …

http://www.youtube.com/watch?v=kdilaIUTBEC

or

http://code.google.com/p/chemitorium/
http://www.youtube.com/watch?v=nxUGTji9jh0&feature=player_embedded
Veterinary microbiology

Depressed sheep

You have recently graduated and decide to use your hard won BVSc to travel a little ... apply for a locum position at "James Herriot's" practice ... a number of Suffolk ewe gimmers (two teeth) ... have a head tilt, and are circling ... unable to swallow. You decide to postmortem one of the sheep and examine the brain.
Gram Stain of section of a brain

Examine and interpret this test.
Is the organism gram positive or negative?
What shape are the organisms?

Primary Culture and Tests
Blood Agar (aerobic) - SBA 48 hr

Examine and interpret this test.
Is the growth good?

- good
- sparse
- none
~40 cases: 7-year evaluation

Student enthusiasm & more authentic learning

Initial resistance

Adoption elsewhere

* Peer teacher concerns → lone ranger
* No long-term learning

McNaught, Whithear & Browning (1999)

http://mycocaine.files.wordpress.com/2009/06/roller-coaster-one.jpg
We now use the term ‘learning designs’

Bringing technology and pedagogy together

Lockyer, Bennett, Agostinho & Harper (2009)
Learning designs

- Web functionality
- Learning objects/materials
- Learning activities
Decision questions

- Who are my students?
- Why am I teaching this … ?
- Which content? In what form? How much? Who finds it?
- Relationship between online and F2F?
- Getting feedback to Ss on their learning?
- Getting feedback to Ts on Ss’ learning?
- Is this learning going to last?
- Can I do this better?
The e+ project

- Originally ‘ePLUS Web’ – evaluating the Potential for Learning: Use and Structure of the Web
- 20 active & successful eTeachers.
  - Courses: 7 language, 3 engineering, 3 basic science, 3 humanities, 2 education, 1 social science
- Examination of websites (range of LMSs) & detailed interviews with teachers; survey of students

McNaught, Lam & Cheng (2009)
Using a two-way matrix

Oliver et al. (2002); Agostinho et al. (2002)

<table>
<thead>
<tr>
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<th>Management *</th>
<th>Rule-based*</th>
<th>Incident-based*</th>
<th>Strategy-based*</th>
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# 0, 1 or 2 assigned to each cell

* Can be non-interactive or interactive

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<tr>
<th>What do you do?</th>
<th>Why and how do you do it?</th>
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Summary of 20 course websites

Number of instances

- Asyn. Forum: 14
- Quizzes: 4
- Past papers: 5
- Assignment: 13
- Course info.: 20
- Notes/PPTs: 17
- FAQs: 4
- Tools: 4
- Extended content: 16
- Glossary: 9
- Cases: 4
- Games: 1
- Exhibition of student work: 1
- Learning skills: 2

Web functions
Summary of 20 course websites

- Communication: 20
- Assessment: 30
- Resources (simple): 40
- Resources (enriched): 50
- Course info.: 44
- Extended content: 20
- Glossary: 10
- Cases: 10
- Exhibition of student work: 5

Web functions
Summary of 20 course websites

Main functions

Number of instances

Interactive
Non-interactive

Communication
Assessment
resources (simple)
Resources (enriched)
Summary of 20 course websites

![Bar chart showing the number of interactive and non-interactive instances for different learning focuses: Management, Rule-based, Incident-based, Strategy-based, Role-based. The Rule-based category has the highest number of interactive instances.](image)
Why do this?

- To set up a series of conversations …
- To learn what teachers do and why … and
- To allow teachers to see other design options
Student data from 20 cases
Implications for the meaning of digital literacy

Kember, McNaught, Chong, Lam & Cheng (in press)
These findings fit with long-standing T&L models

E.g. Laurillard’s (1993, 2002) conversational model

- between student(s) and teacher(s)
- between the students
- about the content
- focused on concepts/
  conceptions
- about tasks/ assessments
- about artifacts produced
- etc.
Diagnostic media-enriched explanations - produced by teachers or students

Activities, e.g. discussions, quizzes, games, simulations, debates, roleplays, etc.

Teacher's conceptual knowledge

Student's conceptual knowledge

Discussion

Teacher's conceptual knowledge

Student's conceptual knowledge

Reflection on learning design

Revision of personal ideas

Interaction

Revision of learning strategies

Reflection on interactions

Peer reviews, tests, exams

Revison of personal ideas

Reflection on student work

Teacher's conception of learning design

Student's actions in perception of T&L environment

A range of communication & collaboration opportunities with other students

Reflective spaces, e.g. blogs, ePortfolios

After Laurillard 1993, 2002
A bit more about our students’ and our teachers’ perceptions of T&L and eLearning
Two sets of student data

689 Year 1 Ss and 56 of their Ts across all 8 Faculties at CUHK

Students use technology a bit more than teachers. But for learning?

McNaught, Lam & Ho (2009)
Using online tools and strategies (frequency) by teachers students [S] and teachers [T]

[*** p-value <= 0.001  * p-value <= 0.005  * p-value <= 0.05]
Survey of 1438 students at CUHK, representative of gender, year level & discipline

Positive (mostly) expectations of eLearning

Further, students with HIGHER use of eLearning were MORE positive about BOTH the usefulness of the eLearning strategies AND their own personal gains in learning

Lam, Lee, Chan & McNaught (2010)
Teachers are individuals with different beliefs & practices

Bain & McNaught (2006)

22 cases of Australian academics using technology-enhanced teaching
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Technologies to watch
Horizon report

- One year or less: Mobile computing
- One year or less: Open content
- Two to three years: Electronic books (iPad!)
- Two to three years: Simple augmented reality
- Four to five years: Gesture-based computing
- Four to five years: Visual data analysis methodology

So, lots more new tools coming …
New tools WITH learning design

- Example: MIT Center for Collective Intelligence

- Argument mapping. “The Deliberatorium is an implemented, evolving, web-based system developed to help large distributed groups efficiently arrive at well-founded conclusions concerning responses to complex challenges like climate change. It has been used by over 700 users, so far, on topics ranging from bio-fuels to open computing.”

  [Link](http://globalsensemaking.wik.is/About_GSm/Existing_Sm_Tools/Collaboratorium)
Structuring an argument

- Issue
- Idea
- Pro
- Con
On balance …

“I think it’s main strength is that it allows us to tap, in ways not previously possible, the skills and knowledge of large numbers of people in the service of solving complex multi-disciplinary problems. I think it’s main weakness is that it is currently based on a style of interaction that is somewhat formal and artificial. Our goal is to integrate the strengths of a deliberation map with the narrative conversational modes of interaction that people find natural.”

http://cci.mit.edu/klein/

Mark Klein
Lots happening …
Convergence?

- New tools
- New contexts
- New opportunities
- Ongoing principles to guide us on this journey …

http://www.parkenet.org/jp/challenges/convergence.jpg
Summary

Themes:

- Negotiate educational beliefs in each situation
- Focus on the details of learning design
- Consider the importance of relevant and authentic tasks that enable learners to develop lifelong learning and earning capabilities
- Accommodate shifting roles of both teachers and learners in a mutual comfort zone
- Enjoy the experience!
Thank You


