An Introduction to Online Teaching and Learning

‘Good teaching is good teaching, no matter how it’s done.’
Instructional Method Workshop

Part 1
How do we learn?
OBJECTIVES

- Given an introduction to the different learning theories
- Introduction to the pitfalls of online learning
- You will have an understanding of how human memory works
- Understand the basics of Cognitive Load Theory
How do you teach?

Why do you teach this way?

Do your students learn effectively?
<table>
<thead>
<tr>
<th>Old Assumptions</th>
<th>New Assumptions</th>
</tr>
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<tbody>
<tr>
<td>1. Knowledge transfer is <strong>easy</strong></td>
<td>1. Knowledge transfer is <strong>difficult</strong></td>
</tr>
<tr>
<td>2. Learning is <strong>decontextualised and abstract</strong></td>
<td>2. Learning context and content is <strong>relevant</strong></td>
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<tr>
<td>3. Learners’ are <strong>receivers of knowledge</strong></td>
<td>3. Learners are <strong>active constructors</strong> of knowledge</td>
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<td>4. Assessment relies more on repetition of facts than application of knowledge</td>
<td>4. Assessment must be more <strong>holistic and relevant</strong> as well</td>
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Table 1: Old versus new assumptions about learning (Grabinger, 1996: p.667)
FOUR BASIC TYPES OF LEARNERS

• **AUDITORY LEARNERS**
  - Lectures
  - Discussions
  - Presentations
  - Tasks with Specific Answers
  - Recitation

• **VISUAL LEARNERS**
  - Bars
  - Charts
  - Flow Diagrams
  - Pictures

• **READ/WRITE LEARNERS**
  - Read information for themselves
  - Modeling
  - Creativity
  - Open-ended questions

• **KINESTHETIC LEARNERS**
  - I DO SOMETHING
  - I INTERACT
  - I LEARN
ONLINE LEARNING
Interesting Point to Ponder…

- Mioduser et al. (2000) conducted a survey of over 400 science and technology educational websites
- Educational websites dominantly text based
- Only 31% used graphics commonly, and only 1% of the sites exploited interactive graphics
- Modern pedagogical approaches are far from being implemented appropriately in most educational websites
What are the problems with Web-Based Learning Systems?
Limitations of a web-based learning system

- Refuse to accept online learning
- Lack of human element
- Concerns about clarification and understanding
- Miscommunication between perceived knowledge and actual knowledge
- Re-usability of web resources
- Student assessment and feedback is limited
- No interactivity
- Faculty availability
- Concerns about levels of computer literacy
- Information is presented in a manner that is difficult to understand
Welcome

Welcome to Beta of the 2nd Edition of the PVCDROM

Since we released the first edition of the PVCDROM the internet has expanded enormously and high-speed connections are common. We have decided to release a beta version of the second edition of the PVCDROM on the web and later release it as a CDROM. Once the final CDROM is released this website will be maintained. Over the coming months we will be adding chapters as they are ready for release. As this web version of the PVCDROM is in beta testing the acknowledgements are not complete.

This edition of the PVCDROM is a result of the Solar Hydrogen IGERT, a collaborative research program including the University of New South Wales.
Before you do anything else there are a couple of things that ALL e-Learning courses need:

• Title Page
• Table of Contents
• Instructor Information
• Course Objectives
• Course Structure
• Resources
• Readings
• Course Requirements
• Course Calendar
• Contact information
• How to be a successful online student
CENTRAL AIM OF LEARNING

• To increase knowledge in our Long Term Memories
The LEARNING PROCESS

• Sensory Memory
• Short-term Working Memory
• Long-term Memory
The Learning Process…

VISUAL STIMULI

AUDITORY STIMULI

Transferal and Retrieval

LONG TERM MEMORY

WORKING MEMORY

SENSORY MEMORY
Sweller refers to these as SCHEMAS.
BRAINSTORMING

CARS
CARS

Your schemas are unlimited and continual...

Makes

Ford

Etc...
Rules of Road

Makes and Models

Dangers…

Overtaking

Parking

Fords

Blind side

Mechanics…

Oil

Drunk Driving

And so on and so forth…
COGNITIVE LOAD THEORY

What is it?
The 7 + or – 2 Principle

• Introduced in 1956 by Miller

• Early introduction to CLT

• Our STM can handle between 5-9 new bits of information, and no more

• A little experiment…
The number’s game...

• 3 2
• 8 5 2
• 9 3 7 1
• 5 9 2 4 8
• 6 5 3 8 4 6 9 2 1
• 6 2 7 1 0 9 5 3 8 2 9
• Cognitive Load is a term (used in psychology and other fields of study) that refers to the load on working memory during problem solving, thinking and reasoning (including perception, memory, language, etc.).
Cognitive Load Theory, as defined by Sweller (1988) states that optimum learning occurs in humans when the load on working memory is kept to a minimum to best facilitate the changes in long term memory.
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Cognitive Load Theory

- WM is limited in capacity to about seven informational units.
- Long Term memory is unlimited in capacity.
- Knowledge is stored in long-term memory as schemas or schemata.
- Schemas, no matter how large or how complex, are treated as a single entity in working memory.
- Schemas can become automated.
What Hinders Learning in Working Memory?

**EXTRANEOUS COGNITIVE LOAD**
This is any cognitive activity engaged in because of the way the task is organized and presented.

**INTRINSIC COGNITIVE LOAD**
Relates directly to the to-be-learned content

**GERMANE COGNITIVE LOAD**
Making a novice into an expert and creating new schema adds to the load on working memory.
Intrinsic + Germane + Extraneous = Total Cognitive Load
The Fundamental Modules

• Courses \rightarrow difficult

• Information you present in your FMs must be BUILT up gradually from the previous information

• High level of Element Interactivity

• What proceeds \leftrightarrow precedes

• Learner’s \rightarrow High Level of CL on WM
My advice to you now:

- Create the opening page to your online course

- Make it user friendly and specify clear times that the students can get hold of you

- Decide how you are going to break the syllabus down into workable units/chunks of information
Next time…the 8th wonder

- How can I reduce Extraneous Cognitive Load in my fundamental module?
See you next time…

Date: 26th April
Time: 11am
Same place