CERE slideset 5:
Concepts and Empirical Results in Education

Expectation effects
Motivation
Course overview / practice / exams
etc.

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L4 "CERE"   18 March 2015

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Expectation effects in education

Expectations

- Basic effect (punch card training; my microCT exercise)

- **Rosenthal's pygmalion effect of Teacher expectations**

- Draper 2009b paper: an interpretation of learners' self-adjusting decisions (including expectations)

- Dweck (Mueller & Dweck 1998)

- Stereotype threat

    (see http://www.psy.gla.ac.uk/~steve/localed/dweck.html)

Learner motivation

Learner motivation

I began the course by saying that you might define HE as where learning depends almost entirely on learner motivation (students learn almost nothing unless they intend to); while infants (perhaps up to about 7 years old?) learn ferociously but without experiencing it as a choice.

So learner motivation could be the single biggest factor in determining achievement.
(Motivation + good goal + effective method + exec. ability)

If you want to look at the psych. literature on motivation, the introduction section of Lieberman & Remedios (2007) is a starting point. [Pintrich is a leading researcher]

Their paper as a whole is about an interesting phenomenon:
the collapse of intrinsic or a rise in extrinsic motivation in HE students.   Satiety?

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Intrinsic / extrinsic

The traditional distinction is between intrinsic and extrinsic motivation.

Intrinsic
E.g.: love of psychology, pleasure in attending your evening class

Extrinsic
E.g. Need the certificate for my next job; have to learn about autism to care for my own child.

Most people probably have a mixture, not one or the other
(Stephen King; J.K.Rowling; Larry Niven).
(1) In fact it may be better to think of them as 2 independent dimensions; not as either/or.
    Rise in one may *look* like a fall in the other, but not be.
(2) Breathing

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Video games

- 32% of all adults (34% of men, 31% of women) in the UK describe themselves as 'gamers' (Interactive Software Federation of Europe)

- One child in two plays games every day (ISFE, 2010)

- 2011's *Call of Duty: Modern Warfare 3* out-grossed the last four *Harry Potter* films combined (GFK Chart-Track, 2011)

- The average age of a gamer is estimated to be somewhere in the mid-thirties, with the Entertainment Software Association placing the current figure at 37.

Video games consist of learning tasks

- Best-designed games typically comprise a series of **coinciding or intersecting goals**, with **short-, medium- and long-term conclusions**

- This arrangement of goals, which **permits the student to progress on a number of fronts** – even when one goal is seemingly out of reach – has some significant advantages for **student engagement**

- More difficult to implement in a structured, often didactic, educational environment such as a school or university?

=> Video games are founded on an intrinsic love of learning

Turnover (it's big business)
Not just the young.   Not just males.
Voluntary creation of informative websites ....

=> At bottom, the motivation seems to be an intrinsic love of learning stuff which is of no possible extrinsic use in the real world.

so why does formal education do so poorly?   9

Can goals be taught? yes.
Can intrinsic motivation be taught? yes.

Clearly one job of Teachers might be to tell students what they must do, must learn. Yes, goals are routinely taught.

But sometimes a love of a subject is taught: intrinsic motivation being transmitted.
"Enthusiasm" is regularly one feature student evaluations show is valued by students: should we see that as teaching intrinsic motivation?
[Yao's Hebrew class.   Henry Moore's student]

Also: consider:
- Values (a way of choosing goals; creating them from new contexts)
- Goals (concrete things to achieve)
- Plans (methods for learning)   10

Constructivism and learning goals

But in fact, learner and teacher goals may be much more similar than either realise. The clever teacher gets students to "create" their goals, so they "own" them: with motivation benefits.

Hebb (1955): no teaching until the school children asked for it.
Gordon Doughty: start a lecture by getting students to say why it is worth teaching and learning that lecture.

Consider your maxi projects / CRs: large amounts of self-choice?

Positive view: L&Ts agree the goals, which are then jointly held and owned.
Cynical view: Ts manoeuvre Ls into re-inventing what T wants.

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Students' real goals

But most of the discussion of learner motivation is only about motivation to learn content.

What are learners' actual goals when in the middle of a course?

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Snyder: "The hidden curriculum"

Different students want and get different things from the same course.
(Just as different readers see and get different things from the same book, if it's good.)

One sense of a curriculum being hidden, is that it is hidden from the teachers.

Which goal are students pursuing, and regulating?

1. Learning stuff (content knowledge): will show in future process and products (Do I know this stuff yet?)

2. Effort (Put more or less time and effort into this goal?)

3. Doing stuff, a current assignment: (doing corrections on this product)

4. Choosing future courses (/ careers).

(See Draper 2009b)

=> much of the time it is NOT content knowledge which students are improving in the light of feedback.

Learner autonomy; and proactive-ness

Allen Tough: adult learners create and pursue their own learning goals. A huge hidden phenomenon. They also mostly organise it without paid teachers.

A slightly different question: are learners (on a given course) **proactive**? See the 4th dimension in my table of all the ways learners benefit from others.
Generally, for most activities, we can see cases where the teacher initiates (and organises) it; other cases where the learner does.

Connections to points already made about motivation

• The LTP "management layer": how it is negotiated between learner and teacher

• Snyder and "the hidden curriculum": different students want and get different things from the same course (as readers do with a book).

• The different goals a student pursues (Draper 2009b): choosing courses, managing effort, ...

• Allen Tough

• Learner pro-activeness (as in the big table last time)

• Contingent tutoring; Vygotsky.

Contingent tutoring and the management layer

Contingent tutoring not only scaffolds the knowledge / skill being learned, it ALSO scaffolds the management of the activity.
The tutor is the only one at first who understands how the actions piece together, and perhaps what the goal is. As the learners progress they manage larger and larger chunks of action themselves, and increasingly understand why they are doing each action.
C-tut is operating simultaneously at the knowledge and management layers.

Often the learners are learning the goal and its meaning as well as how to achieve it; and certainly each subgoal.
As a child you play doctor and wear a white coat; in medical school you learn what it is to "be" a doctor.

C-tut embodies the Vygotskian idea of how goals are "taught".

Motivation type 2

Vygotsky draws our attention to how willing we are to go along with other people, with a group or a leader, without understanding what we are doing or why.

(Milgram, the holocaust, joining in a song, ...)

It's not too strong to say that we have one motivation system determining what we initiate and complete by ourselves; and a second different one that determines what we will go along with. Without the second, we probably could not learn much at all.

Aspects:

Cognitive, motivational, social

See them as parallel aspects.

Svinicki

In a simple paper Svinicki (1991) suggests that there are 3 independent psych / educational theories which independently can be used to improve teaching:
• Cognitive
• Social
• Motivational

This implies that:
A) Sticking with test scores that measure learning outcomes (a cognitive view) is not capturing all that is essential in education
B) Any learning design will have effects of all three kinds. Genius designs will address all three.

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Examples

My RPC (reciprocal peer critiquing): a successful exercise both causes learning and bonds the team/group; which then makes later L-activities go much better with much higher student autonomy and reciprocal support.

Jigsaw (Aronson) both bonds a class even in unpromising circumstances (Texas and school desegregation); and supports learning. These are quite different effects. [Sherif]

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Perspectives

The idea here is that each perspective can be analysed independently of the others.
(Even though in reality, any learning design or activity usually has effects in all 3 domains.)

(This is common in engineering: electronics, coffee mugs, ...)

Many experiments only take one perspective; but a real practising teacher should address all of them.

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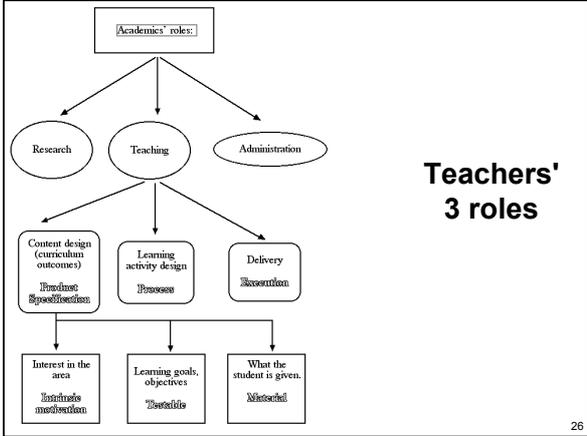
"Interaction":

Various meanings

Interaction / "engagement"

❑ The super-principle of iteration and convergence: learner and teacher go to and fro to approach a common understanding.

❑ Peer interaction.

❑ Discussion as a key learning activity

❑ Chi (2009) proposes a scale of increasing learning effectiveness:
  a) Inattentive
  b) Passive e.g. listening
  c) Active e.g. answering a closed question (e.g. an MCQ)
  d) Constructive e.g. generating reasons or "self-explanations"
  e) Interactive (with peers).

❑ Stuff about "engagement" and "interaction" on classroom computers is between [b] & [c] above: mindless button pushing

3 Roles of Ts

Delivery / implementation / execution

Teachers' 3 roles

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Teachers making a difference

Teachers clearly can make a big difference to learning;
but not in the way almost everyone automatically thinks almost all the time. It is mostly not the face to face contact ….

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3 roles of teaching

(Academic jobs are typically expressed as having 3 kinds of work: Research, teaching, administration.)

But in fact, teaching has 3 facets.
And a person might be excellent at one, yet rubbish at another.
I.e. good teaching is not a single thing

1. Knowledge selection and expression.
    (The biggest recorded effect: chick-sexing; but not easy to see how to generalise it.)

2. Designing learning activities.
    (The most published research; some of it with big effects e.g. Mazur.)

3. Delivery e.g. lecturing, facilitating discussions.
    (Not a bottleneck in practice.)

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An example of a non-priority

The mind-boggling papers showing that where a student sits in a lecture theatre <u>causes</u> a difference in their final course mark.
Perkins & Wieman (2005). Random assignment of seat position.
Mean final grade of each group "on the edge of significance" but bigger effect on top 20% and bottom 10% of marks; and on attendance.
Griffith (1921) is similar. About 10% mark difference between back and middle of the room.
(But Kalinowski & Taper, 2007 found no such effect.)

This is amazing, worrying, and interesting. But the effects are not very big: this is not a bottleneck, significant as it may be for theory.

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Not 3 but 5 roles in teaching?

I've used the first 3 roles to structure some of this course.
But 5 gives a fuller picture:

1. Content selection (syllabus)
2. Learning design selection
3. Delivery (both lectures and tutoring)
4. Management layer. (Who initiates and manages actions? Shared with the learners.)
5. Certification, exams, summative assessment

Subdividing roles

Furthermore, at least some roles can be usefully subdivided.

1. Content selection (syllabus design):

1a Interest not content goals (learning aims; cloning the teacher)
     [Yao, Mitra's grandmothers, ...] Telling a learner what is
     and isn't a good question, ...

1b Content goals (learning objectives)

1c How these are expressed to learners
       notations, ...(e.g. chick sexing)

Proc and decl

Procedural vs. declarative knowledge

"Declarative" knowledge includes facts, concepts.
"Procedural" knowledge is knowing how to do something.

Learners may need testing on declarative knowledge but in fact
   they can test themselves; and more importantly, they can self-
   correct once they have noticed they got a fact or concept
   wrong. Human feedback is seldom essential, though getting
   them to **use** material in order to provide occasions for noticing
   their own gaps is important.
(Catalytic assessment; confidence testing; ….)

Procedural knowledge

A fact is a single item: if it's wrong, there's no puzzle where the
   problem is.
Any procedure, however, is a long sequence of actions. If it's
   wrong (produces the wrong answer or effect) it is generally not
   clear which part of it was wrong. Diagnostic feedback is very
   important, though advanced learners eventually acquire
   sophisticated meta-procedures for self-diagnosis of failed
   procedures.
If you give me an essay and I just say there's something wrong
   with it, that is of little help. If you bake a cake, and when it
   comes out of the oven it is obviously bad, again you are often
   at a loss. Similarly if your computer program just fails, you
   don't know which line and which character is responsible.
Generally speaking, procedures have many more component
   parts; and learners are much more in need of both practice
   and helpful feedback in learning them.

Feedback on procedural learning

The literature also supports this, that feedback has more positive
   effect on learning for procedures than for declarative material.

Hattie & Timperley (2007) "The power of feedback" can be
   interpreted as arguing that feedback on procedural learning is
   more important, because (only) it leads to transfer.

So: procedural vs. declarative learning

Chick sexing is a procedural skill.
The Biederman dramatic improvement in effect converted a tacit
   procedural skill into a declarative one.
Quite likely, this type of manoeuvre would work in general.

Teacher training is a case for reflexive application of this;
I.e. the evidence seems consistent with the idea that teacher skill
   makes a big difference to learning outcomes BUT is largely
   tacit I.e. encoded as a procedural skill but not much accessible
   to conscious reasoning.

About the course

About the course 1

- **Survey of the course as a whole**

- **Exam advice**

topics (incomplete list)

Feedback
Chi 2008: paper on watching videos of tutorials
Draper 09b: Different goals learners work to achieve; different interpretations of a piece of feedback
Constructivism / Social Constructivism
Big effects in education
The three roles of a teacher
The importance, or lack of it, of a teacher
Contingent tutoring
Laurillard model
Deep and surface learning
Perry's model
Reflection
Interaction
All the ways in which others may assist a learner (table; 4 binary dimensions)
Learning as Participation (not Acquisition)
Learner motivation (perhaps including expectancies;   perhaps including pro-activeness)
Expectation effects
Read, discuss, write: the fundamental triad for studying?

Questions for each issue

I'm going to pick some of the issues randomly. For each picked:

1. What other topics is it strongly linked to, and why?

2. How to apply it to this course?

3. How to apply it to the maxi project?

4. How to apply it to the L3 statistics course?

Exam /revision advice

There are past/ sample exam questions, some with outline answers on my course web page.

The style of question generally asks you to link some topics

A general criterion for marking is whether the answer displays critical thinking.

In this course particularly, linking the ideas to your personal experience (of education) is appropriate and shows you have understood the ideas (not just learned their names) by giving an example that was not given in the lectures.

About the course 2

The coursework assignment: authoring a wiki page.

A place to stop

For the slides, handout etc. see:

http://www.psy.gla.ac.uk/~steve/courses/cere.html

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"Creativity"

Creativity

To count as creative, the product must have all these properties:
- Human agency (as its cause)
- Utility (i.e. of value to people)
- Novelty (as a matter of history)
- Surprise (contrary to expectations)

It consists of a new configuration of old elements.
It consists of combining a use and a means for achieving it.
You may have a use and search for a new means; [better coffee mug]
     or have a means and search for a new use. [postit notes]

Ken Robinson argues that the economy now and in the future depends on having creative people; and that our education system kills off this attribute.

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2cc: the two channel classroom

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rewrite slide? 2cc: The two channel classroom

I call this idea "the two channel classroom" (2cc).

- The traditional idea of a lecture is that T broadcasts, and Ls silently process that individually by writing paraphrased notes.
- Thus there is actually a second channel anyway, for any active learning to occur ⇒ I.e. attention can NOT be exclusively on T.
- The new feature is that this second channel might be broadcast: so that peers could share their active experience of the lecture in a way likely to promote learning, without interrupting channel 1. (Also, questions for T posted. cf. JITT)

Relative to unreflective standard practice, this is a sophisticated challenge to our concepts of what engagement can and should be; of what interaction should be; and of (my / any) simple division of teacher-learner interaction vs. peer interaction.

It also addresses what learners are actually doing in their minds during a lecture.

2cc (cont.)

- Learners are not (should not be) spending all their attention on receiving what teacher says, but half of it on processing it.

- Writing is the traditional way of doing mental (re-)processing.

- Modern technology means learners could share this writing if/ when it is useful to do so, without disrupting others' listening.

- What types of thinking might they thus do and share in class?

What types of thinking might learners do/ share in class?

- Asking questions about what they don't understand
  [other students may answer. Teacher could address these later.]
- Answering (other students') questions: learning by teaching.
- Searching the web to improve, fill in, the slides e.g. better diagrams, exact citations, additional citations
  [Sarah did this in my class]
- Paraphrasing, summarising, elaborating the material (all excellent exercises that generate understanding; but are also useful to self and others).
- Full lecture notes (how often do students request others' lecture notes?*) [Sarah says YES.]*

Brevity

Just as technology may enforce brevity (e.g. Twitter), or not; so it is often learning-promoting to require it (or not) of learners. E.g. "Compose a single tweet that summarises your PhD thesis".

In a 2 channel classroom, students might take conventional notes (long), but share summaries; or share summaries and long versions separately so as to help the reader.

Brevity is good for chunking: for dividing material into chunks, and composing a phrase to stand for the long version. True in the human mind, true of most powerpoint (one bullet point takes 100? 500? words to speak to), true of paper abstracts, ...

Fluent / fluid switches of audience

- Most software is designed for a single fixed idea about the audience; and that in turn means that you have to decide the audience before you type a character; but in fact what is wanted is for the writer to be able to change their selection of a target audience, a distribution list, at any moment. To "release" it in advance (cf. CCTV), after finishing typing (cf. email), or retrospectively (cf. forward email; database retrieval).
- And to turn anonymity on and off.
  Anonymous; a constant pseudonym; real name.
- The technology requirements point here is: we need better facilities so that each user can switch the audience for what they are writing moment by moment; retrospectively, prospectively, concurrently.
- We can already do this partially in some platforms e.g. you can filter twitter posts by author, by subject-tag, ...

Fluent / fluid switches of audience (2)

- This is needed for a 2nd classroom channel (a mixture of private notes, instantly shared bits, retrospective selection of all one wrote, ...)
- It is needed in many applications to assessment: my draft just for me; what I submit to the teacher; letting the whole class see after submitting their own (e.g. you can't see others' work until you submit your own; then all are visible).
- It is needed in classroom "snowball" exercises, where a question is answered first individually on paper, then in pair discussion, then in fours, then in plenary. This traditional teaching method is not yet well supported in software.

2cc: The two channel classroom (1)

Last year in this class, I attempted to introduce Twitter as a second broadcast channel (independent of the first channel consisting of monologue by me in speech and slides).

- The traditional idea of a lecture is that T broadcasts, and Ls silently process that individually by writing paraphrased notes.
- Thus there is actually a second channel anyway, for any active learning to occur. I.e. attention can NOT be exclusively on T.
- The new feature is that this second channel might be broadcast: so that peers could share their active experience of the lecture in a way likely to promote learning, but not interrupt channel 1.

2cc: The two channel classroom (2)

Graeme Pate reports that he gets 3 kinds of contribution on the 2nd channel:

1. "Linking": URLs or literature citations
2. "Reinforcing": elaborations ("re-expressions" in the Laurillard model)
3. "Questions": Q&A where a student posts a question and others may answer it.

That is what we saw some of in this class.

It's a way of getting peer interaction in the classroom; but also, of improving interaction (as opposed to only monologue) between L and T.

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Part D:
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