APEC:
Technoscepticism

Introduction

Huge amounts of money have been and are being spent on introducing new technology to education; and new careers, fields ("e-learning", CAL, …), conferences, as well as research initiatives follow this. They all state or imply that new technology can cause better learning.

Clark (1983) (also Cuban, 1990) argue that there is no evidence whatsoever of this.
And that the thing which does make a difference is changing (improving) the teaching method / learning design.

So should we be technosceptic or technophile?

The big successes with technology

There have been some big educational successes with technology. But note that these have usually NOT been attributed to technology BUT to a new teaching method.

Hake
Crouch and Mazur
Just In Time Teaching (Novak et al 1999)
Baxter 2007
Jaye Richards (in progress)

Hake

Hake (1998) published a survey of 62 courses (6,542 students) all studying the same subject, all using the same standardised test, and using it both pre- and post-.

He graphed the mean gain on each course against whether or not it had used the method of "Interactive engagement".
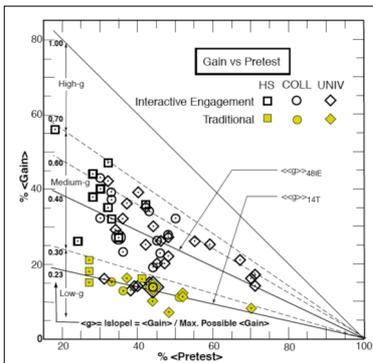

Fig. 1. %<Gain> vs %<Pretest> score on the conceptual Mechanics Diagnostic (MD) or Force Concept Inventory (FCI) tests for 62 courses enrolling a total N = 6542 students: 14 traditional (T) courses (N = 2084) which made little or no use of interactive engagement (IE) methods, and 48 IE courses (N = 4458) which made considerable use of IE methods. Slope lines for the average of the 14 T courses <<g>>14T and 48 IE courses <<g>>48IE are shown, as explained in the text.
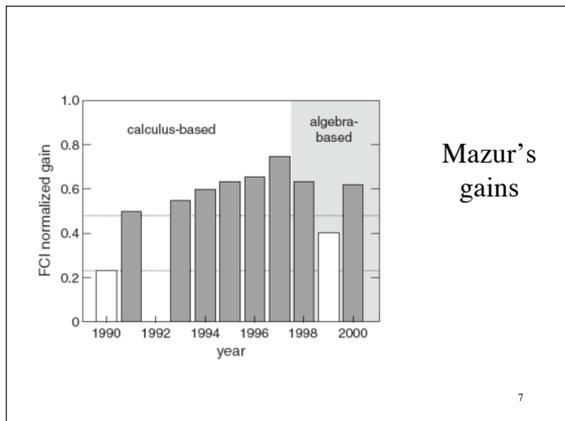
Hake's results

Mazur

Crouch & Mazur (2001) published an analysis of 10 years of Mazur's MIT course.

Again, the standardised pre- and post-test.

He concludes he has doubled the amount of learning, but the graph suggests that really, he tripled it.

Mazur's gains

Just in time teaching

Novak et al (1999)

- Turn giant lectures into seminars:
- Students required to read the text before the class
- Test or query on their understanding
- "Lecture" assembled at last minute to address the problems raised by the student feedback / quiz performance

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Baxter: Psychology first year class

Context:
•560 first year students
•Mixture of psychology majors (130) and those taking psychology only for one year (430)
•6 topic areas, 48 lectures, 4 tutorials, 12 practicals
•Assessment; 2 x MCQs (25%), tutorial attendance (4%), taking part in experiment (5%), essay exam (66%)
•85 VLE groups of 7-8 students

Aims:
•Develop essay writing skills
•Reduce lectures

Structure of assigned group tasks

6   cycles of 3 weeks (one per major course topic)

- Week 1: "light" written task, ≈ 7 short answers, between group members.
- Week 2: Reading task only
- Week 3: "Heavy" written task, typically 7 short answers followed by combining them into a single coherent essay.

Within each week is:
- The Monday lecture, introducing material.
- Immediately afterwards, that week's task posted online, for delivery before next Monday.
- Model answers (a few selected from the best student answers submitted) are posted for the previous week's task.

Big success, apparently!

- Students set targets beyond what was required: contradicts commonly held beliefs about assessment and external motivation (marks)
- Produced work at level 'not seen before' surpassing third year
- Spontaneous discussions about learning and learner responsibility
- Some students burdened by workload but easily detected
- Some groups participants moved at own request (3 groups)
- 13,429 messages posted by groups (postings from 40-400 per group)
- Quality of interactions 'outstanding' across the board
- Atmosphere in lecture class improved and online community

Jaye Richards

Context:
•Glasgow high school
•Mixed ability S3 Biology classes
•Introduced 1 in each 3 lessons on VLE / portal ("GLOW")

•Raised marks by 21% relative to same teacher and class without the technology
•Raised marks by about a grade relative to two other inexperienced teachers

Jaye Richards (2)

Why?

Self-paced learning
Including attention to the quickest students (extra, deeper learning)
and to the slowest (each lesson's 2 most important learning objectives were done first)
Peer interaction (via VLE)

Used to connect the theory and the labs to cases from the wider world (Laurillard principle?)

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Technosceptisim

So is it the technology?

Perhaps the best view is that educational gains only come from identifying and then solving a real educational problem;
But that sometimes technology allows a solution that would be impractical without it.

So anyone wishing to achieve a success had better keep focussed on the educational aims and not on the technology, even though the latter may be part of it.

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Carol Twigg

Carol Twigg has shown that it is possible, across a broad range of courses and institutions, to redesign HE courses so that BOTH

•The learning quality and quantity goes up

•The costs come down.

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Stages of applied research

•Establish effect in lab

•Establish effect in a class room (but with researcher)

•Show someone else can get the effect too

•Set up a training programme for more teachers

•Show that any teacher can get the effect, given your training

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