Teaching as Design

Fred Brooks

University of North Carolina at Chapel Hill

brooks@cs.unc.edu

Added comments from Jim look like this.
Traditional Western Formal Education

- Plato’s Academy 385 B.C.
- Univ. of Bologna 1088 A.D.

Oldest university in continuous operation.

- Student books rare
- Teacher lectures to deliver information
Printing Press ~1440 A.D.

- Radical change in teaching possible:
  - Reading assignment
- But still we lecture!
More Media for Info Delivery

>1800

- Photos
- Recordings
- Movies
- Videos

- But still we lecture!
The World-Wide Web 1990

- Interactive request-delivery
- Incredible scope of knowledge
- Fast search
- Wikipedia
- Totally new means of information delivery
- But still we lecture!
Physics–College or High School

• How many of you had such a course?

• Of you, how many learned physics principally:
  • By studying the text?
  • By listening to the lecturer?
  • By wrestling with the problem sets?

• How many re-studied the text more carefully while wrestling with problems?
Assertion (after Dewey)

• Most of us learned most that we know well by
  • What we did,
  • not by
  • What we read or heard explained.

• But still we lecture!
Paradox

• We learn chiefly by
  Induction
  But
  • We teach chiefly by
  Deduction!

Induction = “student centered”. Give students examples, let them discover general principles.

Deduction = “teacher centered”. Give students general principles, which they then apply to examples.
Including this dictum!

Including this whole talk!
The Scarcest Commodity

• In education, the scarcest commodity, whose allocation causes the most heated debate, is not money, it is:

  • Student Time

Not so sure… we’ve had many many budget cuts since 2015…
The Teacher’s Job is to Design Learning Experiences not principally to Dispense Information.
So, Focus is on

- LEARNING, not TEACHING
- STUDENT, not TEACHER
- EXPERIENCE, not TEXT
- SKILLS, not INFORMATION
- DESIGN, not PREPARE
Donald Schöen’s Insight

• All professional education teaches the skills of the profession by critiqued practice.

• E.g., law, medicine, architecture, the ministry, art, music, social work, and indeed engineering.

  • Educating the Reflective Practioner [1984]

Philosopher & Urban Planning Prof. Donald Schöen – see wikipedia.
How Does This Play Out?

- Assignments
- Flipped classroom
- Quizzes & Tests
- Student-designed lessons
- Project-based learning
- Learning new skills, resources
- Yes, some old-fashioned lectures
Projects

• Costly in time

• Deep vs. broad?
  • Make the curriculum broad, the courses deep

• Collaborative?
  • 2 is magical, 4 is also very good

I think we are losing breadth today. E.g., many of our graduate students now take only courses very directly related to their research areas.

These are references to group size. I think the point is symmetric collaborative groups are better.
Architecture Course Project—Special-Purpose Computer

- Milestones with early deliverables:
  - Application description—Precise
    - Facts missing?—Guess!
    - Better to be Wrong than Vague!
  - Programming manual—End first month
- Intensive critique
- Complete project—End third(!!) month
- Intensive critique
- Do it over!
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