Active Learning

Richard Anderson
University of Washington

What makes a good lecturer?

Student Attention

Attention

Time
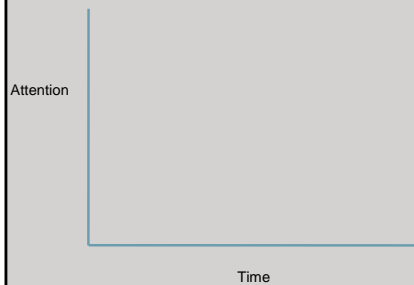
Classroom Activities

- Planned interactions with pedagogical goals

My thoughts on classroom education

- Students must be engaged in the classroom
- Students must think during class
- There is more to lecture than just consuming information
- There are many different goals during lecture
- Dependency on type of material and type of student
- I want lots of interaction in the class
- I want many different students to participate

Methodology for lecture design

- Identify overall goal of lecture
- What impact to you want it to have on the student
- Divide the lecture into content units
  – 10-15 minutes, 3-5 slides
- For each content unit
  – Describe goal
  – How would it be assessed
  – Optionally, create an activity
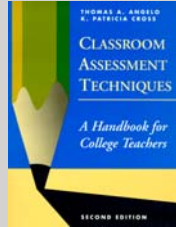 – Put together the slides

Classroom Assessment Techniques

- Thomas Angelo, Patricia Cross
- Introduce classroom assessment
- Catalog of different assessment techniques

THOMAS A. ANGELO
K. PATRICIA CROSS

CLASSROOM ASSESSMENT TECHNIQUES

A Handbook for College Teachers

SECOND EDITION

What is the difference between formative and summative assessments?

- Formative
- Summative

Characteristics of classroom assessments

- Learner centered
- Teacher directed
- Mutually beneficial
- Formative
- Context sensitive
- Ongoing
- Rooted in good teaching practive

Seven basic assumptions of Classroom Assessment

1. The quality of student learning is directly, although not exclusively, related to the quality of teaching. Therefore, one of the most promising ways to improve learning is to improve teaching.
2. To improve their effectiveness, teachers need first to make their goals and objectives explicit and then to get specific, comprehensible feedback on the extent to which they are achieving those goals and objectives.

Seven basic assumptions of Classroom Assessment

3. To improve their learning, students need to receive appropriate and focused feedback early and often; they also need to learn how to assess their own learning.
4. The type of assessment most likely to improve teaching and learning is that conducted by faculty to answer questions they themselves have formulated in response to issues or problems in their own teaching

Seven basic assumptions of Classroom Assessment

5. Systematic inquiry and intellectual challenge are powerful sources of motivation, growth and renewal for college teachers, and Classroom Assessment can provide such challenge.
6. Classroom Assessment does not require specialized training; it can be carried out by dedicated teachers from all disciplines.
7. By collaborating with colleagues and actively involving students in Classroom Assessment efforts, faculty (and students) enhance learning and personal satisfaction.
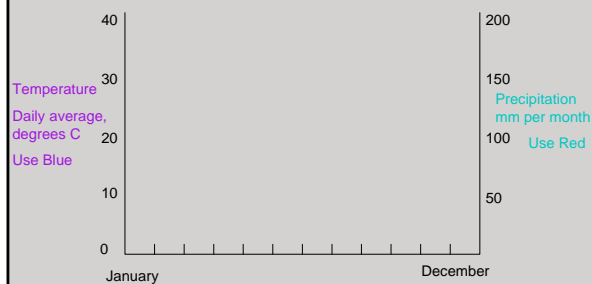
Classroom Activities

- Pedagogical Goals
- Classroom Activities

Discussion Artifact

- Use student generated example to explore different aspects of a topic
- Assess overall understanding
- Diagnose misconceptions

Bangalore Precipitation and Temperature

Temperature
Daily average, degrees C
Use Blue

Precipitation mm per month
Use Red

40
30
20
10
0

200
150
100
50

January

December

Student Submission

Bangalore Weather

Discovery Activity
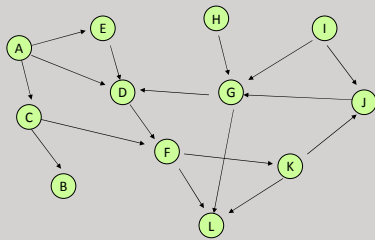
- Have students derive a concept from an example

Topological Sort

- Given a set of tasks with precedence constraints, find a linear order of the tasks

- Label vertices with integers 1, 2, . . ., n
  - If v precedes w, then l(v) < l(w)

Find a topological order for the following graph

Collective Brainstorm

- Generate student ideas for discussion
- Build a list of ideas
- Analyze and evaluate responses

Special problem: Large Size

- List at least three problems trees must face (& solve) because of their large sizes.

1.

2.

3.

Problem Introduction

- Have students explore an instance of a problem before topic is introduced

Determine the LCS of the following strings

BARTHOLEMEWSIMPSON

KRUSTYTHECLOWN

Submissions

Challenge problems

- Competition in getting solutions
- Simultaneous work
- Submission and discussion

Handwriting Recognition: Identify the following words

Problem solving

- Problems for students submission
- Allow all students to work on the problems (and not just the students who always answer first)
- Observe student performance during activity

How many self intersections can a piecewise linear curve with n segments have?