EFFECTIVE TEACHING/CLASS MANAGEMENT

Mid Career Track

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Introductions

Lori Pollock

- PhD University of Pittsburgh 1986
- Sabbatical consulting: ABB Inc & Army Research Lab
- Rice University 1986-1989
- University of Delaware 1990-present

- Research in Software Engineering and Optimizing Compilers

- CRA-W
- CS10K Partner4CS in Delaware
- WeC4Communities
- Comp Thinking in University Gen Ed

Sue Fitzgerald

- PhD University of Missouri-Kansas City 1996 (Computer Science and Telecommunications)
- Industry experience, other faculty appointments
- Metropolitan State University, MN 1996-present
  - Faculty; Department Chair; Director, Center for Faculty Development; Interim Dean, College of Sciences
- Research in computer science education

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**WRITE DOWN
(1 MINUTE)**

WHAT IS GOOD TEACHING?

DISCUSS
(2 MINUTES)

TURN TO YOUR NEIGHBOR AND DISCUSS YOUR ANSWER

REPORT OUT
(5 MINUTES)

SHARE ONE INSIGHT WITH THE ENTIRE GROUP

THINK – PAIR – SHARE

What Would You Do? (5 minutes)

You are an engineer at a major automotive company. You are responsible for the software that measures emissions. Your manager asks you to "adjust" the software so the automobile will report lower emissions than it actually produces. In fact, the car produces emissions just slightly higher than your chief competitor.

You enjoy your job and there are no similar jobs available in the area in which you live. You do not wish to move away from the area for family reasons. In addition, you are in the sixth month of a difficult pregnancy. Your company has been flexible about adjusting your work schedule.

- What are some possible courses of action?
- What are the likely consequences of each course of action?
- What do you think is the ethically correct thing to do?
- What would you do?

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CASE STUDY

SOLVE THIS PROBLEM

Use the classes BinarySearchTree and BTNode to answer this question.

Write a function doubleNode() which traverses the BinarySearchTree and changes the data field in each BTNode by multiplying its original value by 2. The doubleNode() method should belong to the BinarySearchTree class.

FLIPPED CLASSROOM
OR
PROBLEM SOLVING

Active Learning with Booming Enrollments

What can you do to make it manageable **outside the classroom?**

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Active Learning
with Booming Enrollments

- Crowdsource Q&A (e.g., Piazza)
- Automate project grading with feedback
- Undergraduate peer assistants
- Manage individual situations with google forms
  - Form if you are sick and need extension
  - Form if you get test accommodations
  - Form to sign up for alternate exam time
  - Form to request a regrade

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In the Large Classroom

What can you do to make the **class time interactive**?

In the Large Classroom

- Clickers
- Think-pair-share
- Group work with Google forms & visible responses

Google Forms

What does Mystery2 do (in words)?*

What does Mystery3 do?*
(in words)

Google Forms (responses)

H	I	J	K	L
What does Mystery3 do?				
It counts every character in a word except for lowercase "e"s				
It counts the number of characters in the word that aren't lowercase e's.				
It is counting the number of characters in the word that are not e's				
Count the number of characters that are not 'e' in the word				
Mystery 3 returns a given a given word without the lowercase e's.				
Counts the lower case es in the word.				
It returns the number of characters in a word that are not e.				
Counts all of the letters in word that aren't 'e'				
Counts the number of characters that are not e in the word.				
Counts all the characters that aren't e				
counts how many letters there are that are not "e"				
Mystery 3 counts the characters in a string that are not 'e', then returns the total count.				

Engaging students in group activities/large course

Act out stories, games

Everything I needed to know about teaching… - Pollard, Duvall (SIGCSE 2007)

Act out algorithms with the whole class

Make a binary tree with the whole class

Making Lemonade … large lecture classes – Wolfman (SIGCSE 2002)

Act out algorithms with a subset of students

Sorting algorithms – selection sort, insertionsort, etc

CS Unplugged activities

Large Courses Undergrad TAs

- 1 per 5 groups?
- 2 Head TAs
  - Organize training, grading, office hours
- Separate Piazza site for Profs/TA/UTAs

LECTURE WITH DISCUSSION

Small Group Discussion (10 mins)

- Which of these teaching methods did you prefer?
  - Think-pair-share
  - Case study
  - Flipped classroom/problem solving
  - Lecture
- Why?
- Which of these teaching methods do you use?
- How could you include some of these evidence-based practices in your classroom?
- What else do you do that is engaging to students?

SOME RESOURSES

HTTPS://WWW.CS.UMD.EDU/USERS/OLEARY/TEACHCS.HTML

QUESTIONS?