

# Large Lecture Classes: Problems and Solutions

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# Teaching Experience

- 2 years as undergraduate TA
- 1 year as graduate TA
- 35 years at NCSU/Biochemistry
- 16 years : BCH 451 - first lecture course  
200 - 300 per semester

# Problem: cheating on exams

“This never happens in MY class.”

“This is just a minor problem.”

“Honor/graduate students do not cheat.”

“There is no cheating because everyone signs an honor pledge/code.”

“I give up. Everyone is doing it. The curve takes care of the problem.”

# Solution - Environment

- “Watch like a hawk”
  - Seats are too close
  - Impossible to prove
  - Need many proctors
  - Cannot rely upon moral codes

# Solution - Multiple Exams (?)

- Multiple exams
  - Disguised
  - Open – color coded exams
  - Hard to pass out
  - Have to make multiple copies [3 the limit?]

# Solution - Multiple Questions(!)

- Make only one test with multiple questions
- Helps to have very similar but not identical questions
- Can change just the data sets for one question
- A high number of different tests from a small number of different questions



# Solution - Multiple Questions continued

- With just two similar questions in each section, I have 10 unique exams after 4 questions. [ $2^4$  is 16 and  $2^7$  is 128]
- Random selection of the specific digit leads to uncertainty. Students do not know which test is near by.
- Use this for low level questions; have same questions for high level [my point ratio = 1/3:2/3]
- Easier to spot the cheaters. Cheating hurts, not helps
- Small number [1-2 per exam] of incorrect questions being answered. Deliberate? [Lose 1/2 points]



# Problem - Essay questions

- How to ask challenging high level [Bloom] questions in large classes?
- Essay questions - problems
  - changing grading rubric
  - grading time!!! [2 minutes/question >3 hrs]
  - not reading answers carefully [key word search]
  - lot of re-grading

# Solution - Multiple choice (!)

Agriculture is

- (1) the study of plants
- (2) the study of animals
- (3) running a farm
- (4) in steady decline
- (5) the one positive aspect of our balance of trade

# Solution - Multiple choice/grades (!)

Agriculture is

- (1) the study of plants [0.3]
- (2) the study of animals [0.3]
- (3) running a farm [1.0]
- (4) in steady decline [0.4]
- (5) the one positive aspect of our balance of trade [0.6]

# Try again?

## Teaching

is what you do if you cannot get a real job

is the same as instruction

also occurs outside of the classroom

involves more inspiration in large classes

is highly valued in my institution

# Check the answers

## Teaching

is what you do if you cannot get a real job [-1]

is the same as instruction [0.5]

also occurs outside of the classroom [0.5]

involves more inspiration in large classes [+1]

is highly valued in my institution [???

# Solution - Multiple choice/grades (!)

- Can get a better evaluation of the extent of students' knowledge with fewer questions
- Incorporating the grading rubric in the beginning
- Using negative point values removes guessing
- Fewer arguments about almost correct answers
- Develops critical reading skills
- Tests higher levels on Blooms Taxonomy
- More time to prepare good questions
- Many answers are from student quizzes

# Problem: Personal attention

- Large class [ $>100$ ]
  - Impersonal
  - Hard to learn all names
  - Students inhibited from asking “dumb” questions
  - Cannot determine student learning difficulties until too late
  - Only one style of presentation or interpretation of concepts

# Solutions:

- Recitation sections
- Undergraduate Teaching Assistants
- Workbook



# Recitation Sections

- started as pre-exam help sessions
- formalized 10 years ago
- once a week
- small number = 25-45
- quizzes [at end - no attendance problem]
- encourage/require student questions
- not another lecture section! [SI model]
- active student participation - call names

# Undergraduate Teaching Assistants

- experienced the course
- can relate to other students
- more believable
- better trained than graduate students
- can spot cheating easier
- instructor still needs to be there!

# Workbook

- reviews the details missing from text
- provides a focus for information
- provides testing through old quizzes
- provides a summary of information
- study guide
- exercises can be assigned

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