# Blending Technology into the Statistics Classroom:

## A Case Study using Technology to Restructure the Classroom and Improve Teaching and Learning

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# Overall Goals of the "Blended Instruction Case Study"

Re-designing an introductory statistics course with enrollment of around 2000 students per academic year at the UCLA Department of Statistics to:

- Introduce statistics as **a science of data and an interdisciplinary subject** and not a branch of mathematics

- Maximize the role of the students as **active learners**

- Help students to engage in **critical thinking**

- Help the instructors **develop a better sense of where the students are** with respect to their knowledge, attitude, and skills in different parts of the course
- Use assessment as a means for improving learning and teaching
- Establish **closer** student-student, student-instructor, student-TA, and TA- instructor **contact and communication**
- Prepare the students to operate more successfully in the **real world** through **team work building**

# The Structure of the Re-designed Course

- **Two hours of lecture** on Monday and Friday
- **Two hours of computer lab** on Thursday
- **One hour of TA section** on Tuesday

# The Role of the Online Quiz Tool in Learning and Teaching

- Allowing the students to complete quizzes, homework, and labs prior to attending the lab and section

- Providing the instructor and teaching assistant with **immediate feedback about the students' performance** on the weekly quiz

- Giving the students a **second chance to revisit and clarify the concepts and methods** covered in the weekly quiz through group work

# Designing Questions at the Upper-level Thinking: A Challenge

- Partial-credit questions
- Multiple-answers questions
- Sample Question:

  The objective of a study was to examine whether the average SATQ scores of students who were admitted to a particular university was higher than the general population. Suppose that you are hired to analyze the relevant data and report the results to the registrars office. Which of the following options would you pick to explain the findings?

Xbar = 523
Mue = 500
Sigma = 100
N = 225

**I.**     **Since the risk associated with rejecting the true null is more than 5%, we do not reject the null hypothesis and conclude that the SAT scores of the students in this university is similar to the general population. (WW = 0)**

**II.**     **Since the confidence interval doses no include the hypothesized value under the null, we reject the null and conclude that the SAT scores of the students in this university should not be compared to the general population.**
**(R /W= 1)**

**III.**     **On the average the students who are admitted to this university score 23 points higher than the general population on SATQ, but, this difference is not statistically significant. (R/W = 1)**

**IV.**     **We reject the null and we are 95% confident that the students who are admitted to this university score between 10 points to 36 points higher than the general population (R/R = 2)**

# Difficulty Level of Questions

- Level I: Recall

- Level II: Comprehension

- Level III: Application, Analysis, Synthesis, and Evaluation

# Moodle

- A **course management system** designed to help educators who want to create **online courses**

- Large user community with active forums

- Scaleable to thousands of students

- Authentication, tracking, and statis

- www.moodle.org
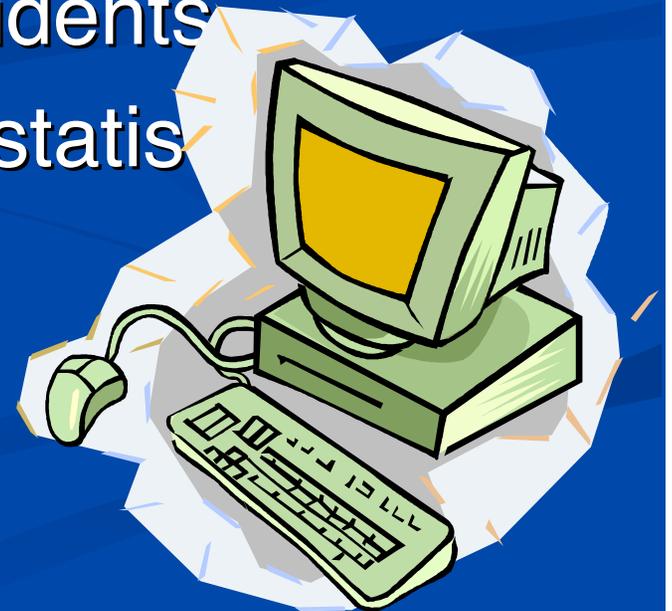
# Quiz Functionality

- Each course instance has test bank
- Test bank items reusable/publishable
- Categorize by content (e.g.: level of difficulty, topic, objective)
- Naming convention for further identification
- Questions can be randomized and shuffled

# Test Items

- Question types:

  Multiple choices, multiple answers, partial credit, true/false, numeric, short answer, matching, fill-in-the blank, embedded

- Images, graphs, links, files (e.g. datasets)

- Customized feedback for student answers

# Test Statistics

- Detailed or simple
- By item or by student
- Downloadable as Excel or text format