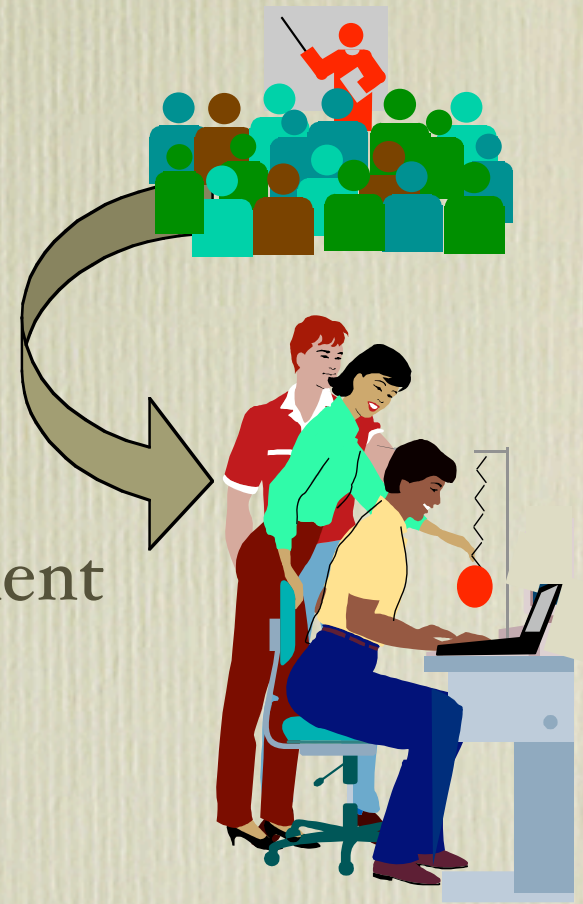
Student-Centered, Technology-Rich Classroom



Southeastern Louisiana University
Department of Chemistry and Physics
Board of Regents Undergraduate Enhancement
Grant: LESQF(2002-03)-ENH-UG-30
PI: Rhett Allain

Starting Ideas:

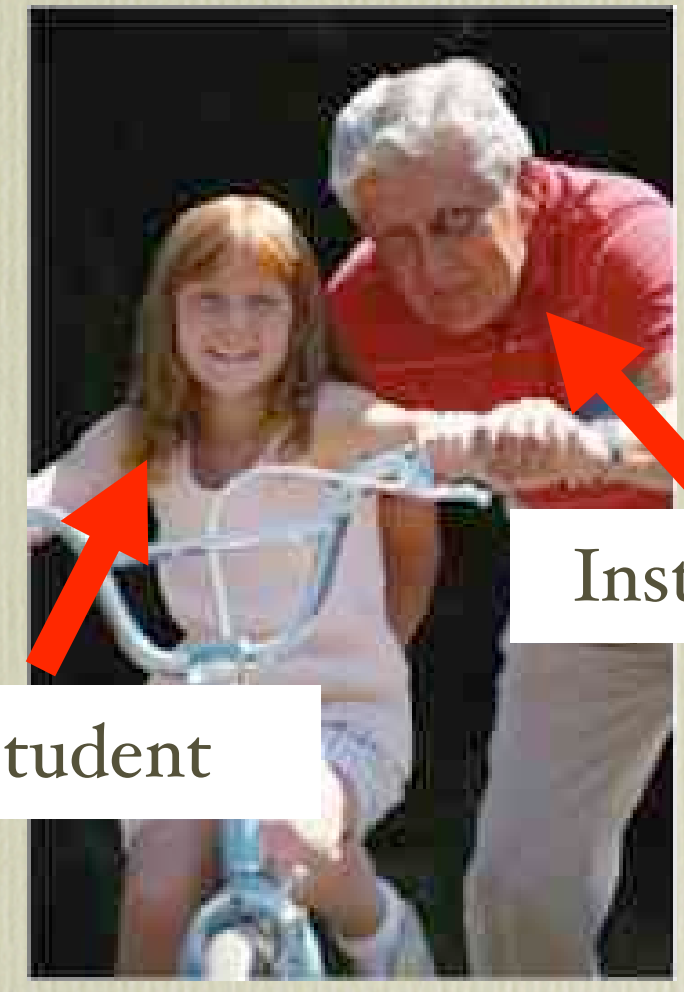
- Traditional Lecture:
  - Instructor-Centered
  - Lecture and labs are “disconnected
  - Missing key elements-
    - Communication skills
    - Problem solving skills
    - Team skills

Student-Centered Learning

(an analogy)

Traditional

Student-Centered



Key Features of the Classroom

- No “front” to the room
- Multimedia capabilities
- Round tables
- White boards
- Laptops

SCALE-UP Curriculum

- Student-Centered Activities for Large Enrollment University Programs.
- Developed at North Carolina State University.
- Meets ABET guidelines for Engineering courses
- Implementations at MIT, U. of Central Florida, U. of Alabama, American University, Western Kentucky, U. New Hampshire, RIT
- Rooms up to 120 students

Basis for SCALE-UP curriculum

- ASEE (American Association for Engineering Education) Survey on job skills
  - Effective problem solving skills
  - Use of computers (communication, analysis and design)
  - Decision making skills
  - Effective oral communication skills
  - **#18** - understanding of the physical and life sciences

Success of SCALE-UP

- Data comparing students in SCALE-UP to students in traditional courses
- **Improved** problem solving
- **Improved** conceptual understanding
- **Improved** attitudes
- **Reduced** failure rates (especially for women and minorities)

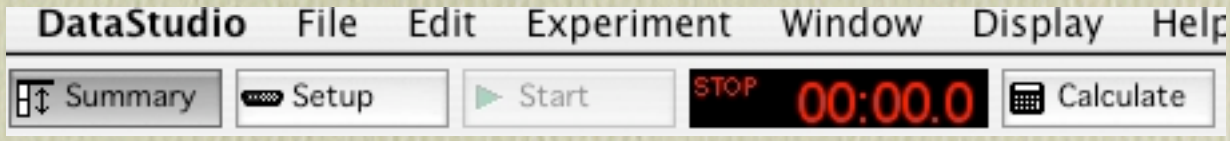
SCALE-UP at Southeastern

- Introductory Physics
- Physics for Elementary Teachers
- Upper Level Chemistry/Physics majors courses

Future Plans

- Increase the number and type of "student-centered" courses
- Create a larger, more adaptable classroom
- Expand physics for elementary teachers
- Student-Centered Introductory Chemistry course for large classes

Activity 1
(Physics for Elementary Teachers)



- Examine the motion (speed) of a cart after it is pushed
- Examine the motion of the cart with the fan turned on
- **GOALS:** The nature of force, relation between force and motion (and nature of science)

Simple Harmonic Motion

(Introductory Physics)

- Measure the period of oscillation for a mass on a spring
- Measure the amplitude of oscillation
- **GOAL:** Explore models, force, acceleration, oscillations

Simulations