Listening. Learning. Leading.

NEW FOUNDATIONS:

Building a Culture of Evidence from the Ground Up

IMPROVING LEARNING AND REDUCING COSTS
New Paradigms in Online Learning

INCREASING ACCESS AND SUCCESS

The Context

- Barely 6 out of 10 degree-seeking freshmen graduate within 6 years
- Graduation rates are especially low for minority and low-income students
- Many institutions lose 1 out of 4 students in the first year

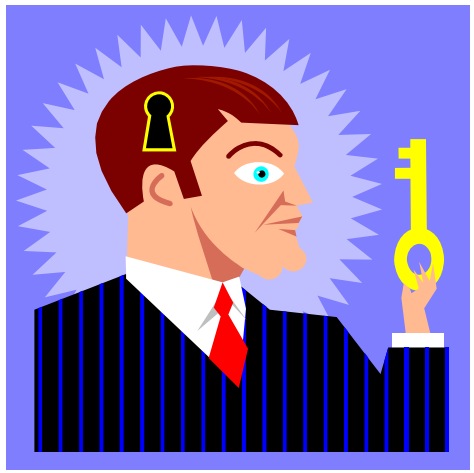
INSTITUTIONAL RESPONSIBILITY FOR STUDENT SUCCESS

- Learning communities
- Student engagement (NSSE and CSSE)
- First-year experience
- Campus climate
- Academic advising
- Student support
- Affective domain

Emphasis on the "Extracurricular"

OUR FOCUS: LARGE-ENROLLMENT INTRODUCTORY COURSES

- Successful course completion is critical for first-year students.
- Typical drop-failure-withdrawal rates contribute heavily to overall institutional drop-out rates between the first and second year.
  - Research Us = 15%
  - Comprehensives = 22% to 45%
  - Community colleges = 40% to 50% or higher



Drop-Failure-Withdrawal Rates Mathematics

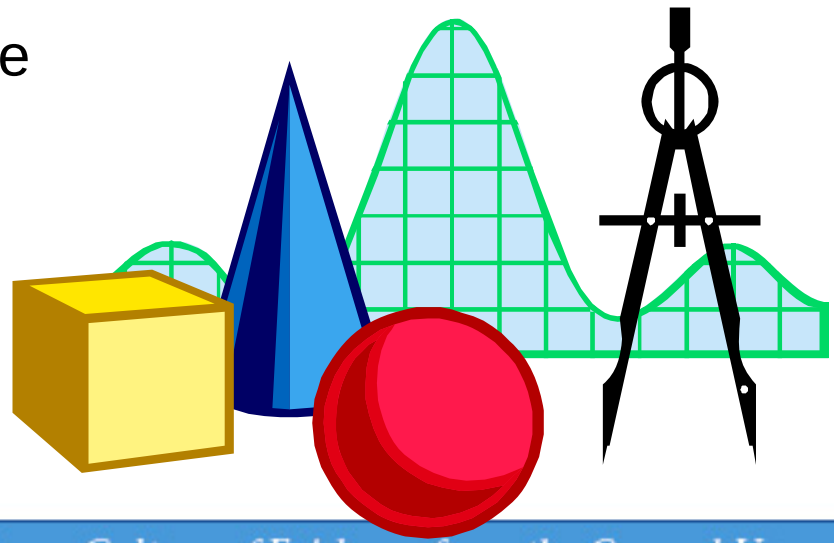
• Georgia State U	45%
• Louisiana State U	36%
• Rio CC	41%
• U of Alabama	60%
• U of Missouri-SL	50%
• UNC-Greensboro	77%
• UNC-Chapel Hill	19%
• Wayne State U	61%

Drop-Failure-Withdrawal Rates
Other Disciplines

• Calhoun CC	Statistics	35%
• Chattanooga State	Psychology	37%
• Drexel U	Computing	51%
• IUPUI	Sociology	39%
• SW MN State U	Biology	37%
• Tallahassee CC	English Comp	46%
• U of Iowa	Chemistry	25%
• U of New Mexico	Psychology	39%
• U of S Maine	Psychology	28%
• UNC-Greensboro	Statistics	70%

THAT'S THE GOOD NEWS!
What do the grades represent?

- Curving
- Lack of consistency
- Lack of coverage
- Inflation
- Time on task - easier course
- Testing vs. consistency



WHAT'S WRONG WITH THE LECTURE?

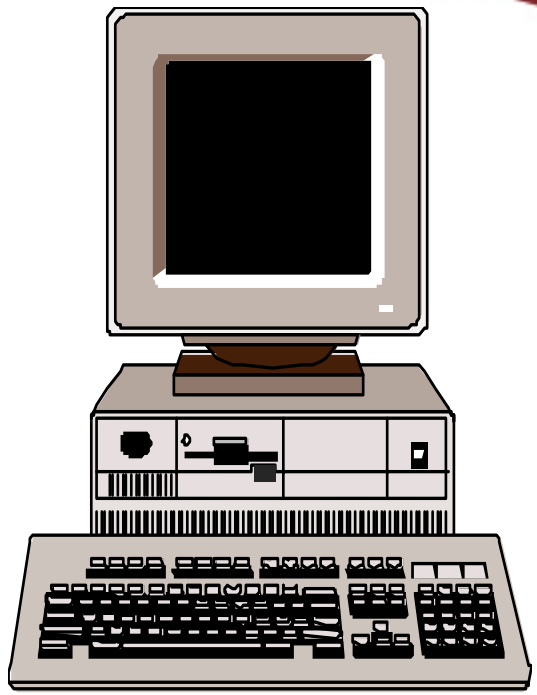
- Treats all students as if they are the same
- Ineffective in engaging students
- Inadequate individual assistance
- Poor attendance and success rates
- Students fail to retain learning

WHAT'S WRONG WITH MULTIPLE SECTIONS?

- In theory: greater interaction
- In practice: large class size
- In practice: dominated by the same presentation techniques
- Lack of coordination
- Inconsistent outcomes

PROGRAM IN COURSE REDESIGN

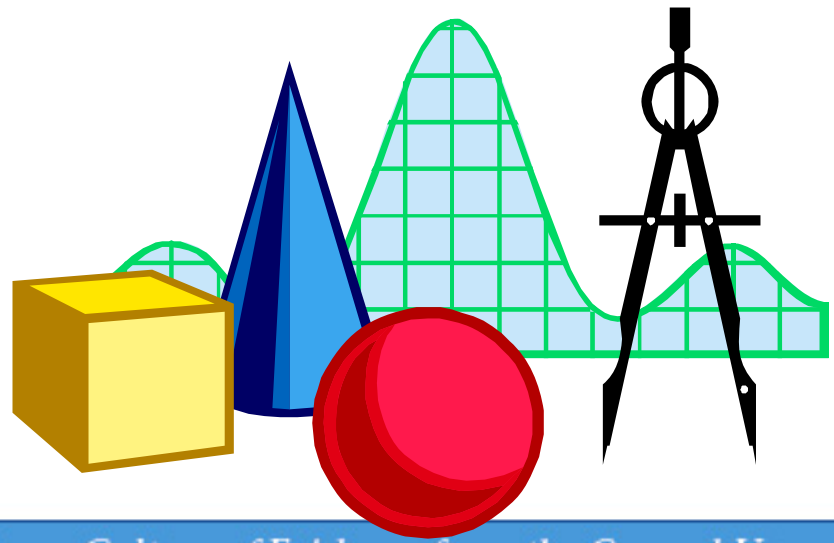
Challenge colleges and universities to redesign their approaches to instruction using technology to achieve quality enhancements as well as cost savings.



50,000 students
30 projects

ASSUMPTIONS THAT GET IN THE WAY

- Improving quality means increasing cost
- Adding IT increases cost
- Using IT may even threaten quality

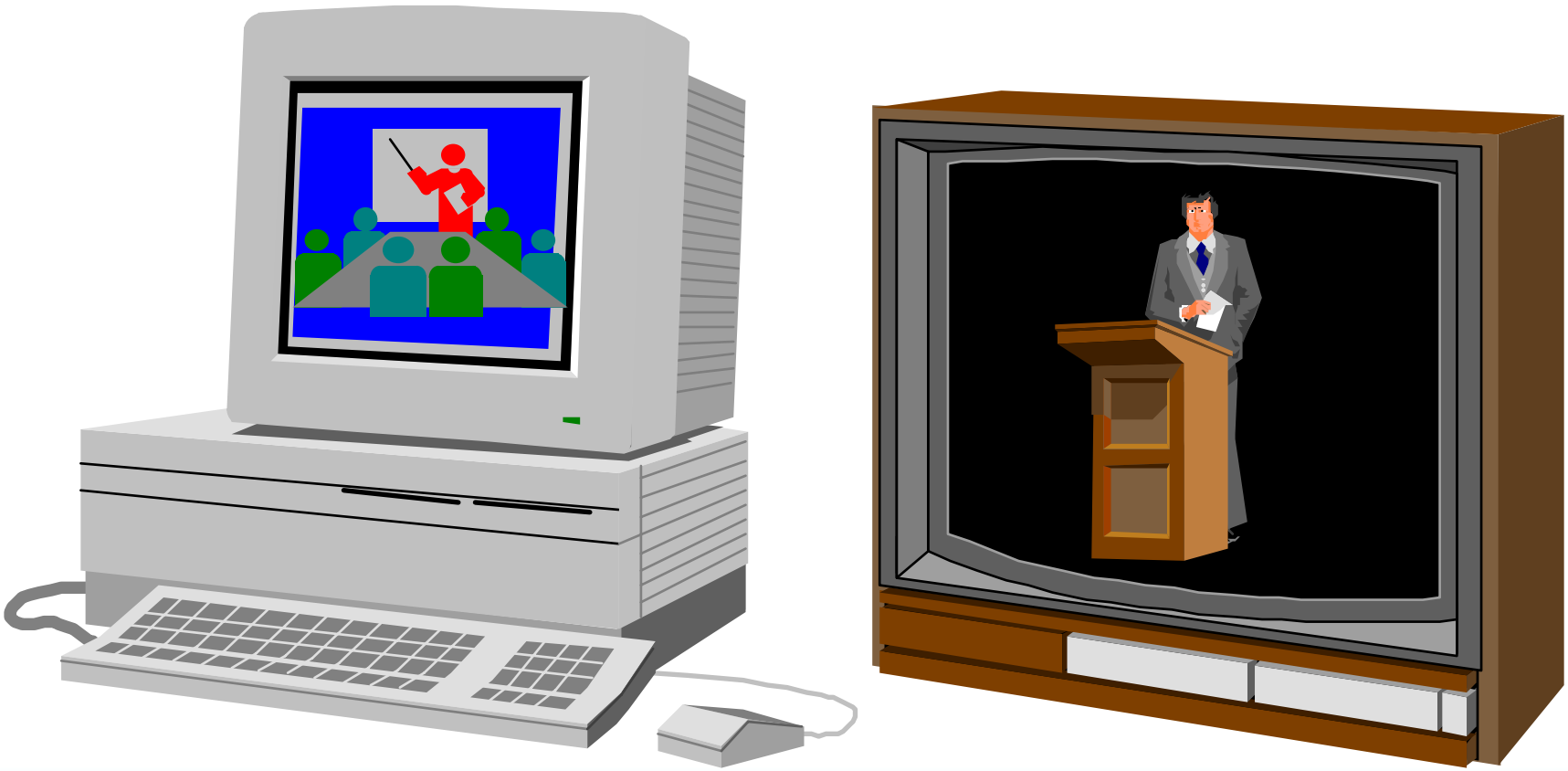


TRADITIONAL INSTRUCTION

Seminars

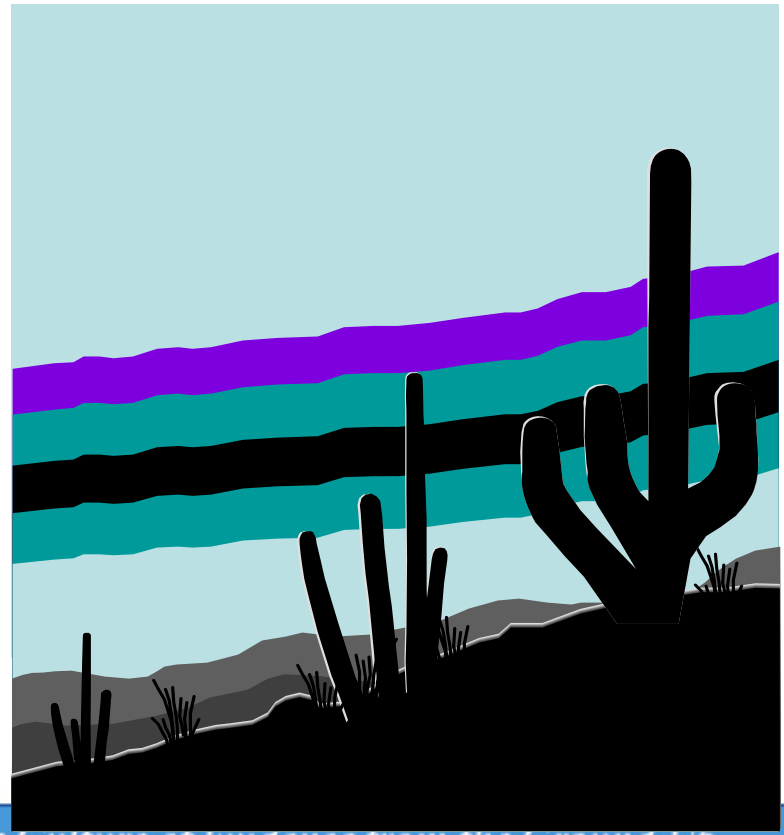
Lectures

"BOLT-ON" INSTRUCTION



THE ONE PERCENT SOLUTION

- Maricopa Community College District
- 200,000 students
- 2,000 course titles
- 25 courses =
  44% enrollment



All CCs = 51%

All four-year = 35%

QUANTITATIVE (13)

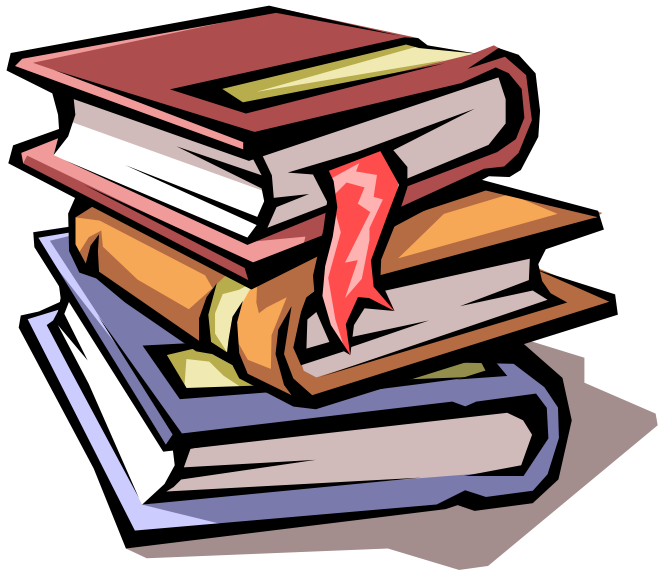
- Mathematics
  - Iowa State University
  - Northern Arizona University
  - Rio Salado College
  - Riverside CC
  - University of Alabama
  - University of Idaho
  - Virginia Tech
- Statistics
  - Carnegie Mellon University
  - Ohio State University
  - Penn State
  - U of Illinois-Urbana Champaign
- Computer Programming
  - Drexel University
  - University at Buffalo

SCIENCE (5)
SOCIAL SCIENCE (6)

- Biology
  - Fairfield University
  - University of Massachusetts
- Chemistry
  - University of Iowa
  - U of Wisconsin-Madison
- Astronomy
  - U of Colorado-Boulder
- Psychology
  - Cal Poly Pomona
  - University of Dayton
  - University of New Mexico
  - U of Southern Maine
- Sociology
  - IUPUI
- American Government
  - U of Central Florida

HUMANITIES (6)

- English Composition
  - Brigham Young University
  - Tallahassee CC
- Spanish
  - Portland State University
  - University of Tennessee
- Fine Arts
  - Florida Gulf Coast University
- World Literature
  - University of Southern Mississippi



IMPROVED LEARNING OUTCOMES

- Penn State - 68% on a content-knowledge test vs. 60%
- UB - 56% earned A- or higher vs. 37%
- CMU - scores on skill/concept tests increased by 22.8%
- Fairfield – 88% on concept retention vs. 79%
- U of Idaho – 30% earned A's vs. 20%
- UMass – 73% on tougher exams vs. 61%
- FGCU - 85% on exams vs. 72%; 75% A's and B's vs. 31%
- USM - scored a full point higher on writing assessments
- IUPUI, RCC, UCF, U of S Maine, Drexel and U of Ala - significant improvements in understanding content

25 of 30 have shown improvement;
5 have shown equal learning.

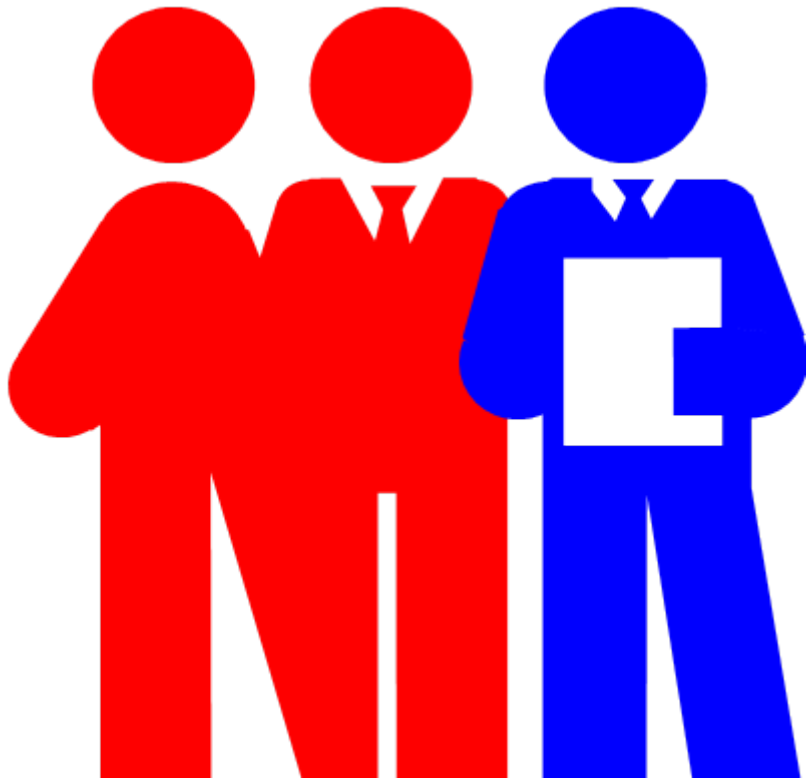
REDUCTION IN DFW RATES

- U of Alabama – 60% to 40%
- Drexel – 51% to 38%
- Tallahassee CC – 46% to 25%
- Rio CC – 41% to 32%
- IUPUI – 39% to 25%
- UNM – 39% to 23%
- U of S Maine – 28% to 19%
- U of Iowa – 25% to 13%
- Penn State – 12% to 9.8%

24 measured; 18 showed improvement.

COST SAVINGS RESULTS

- Redesigned courses reduce costs by 37% on average, with a range of 15% to 77%.
- Collectively, the 30 courses saved about $3 million annually.

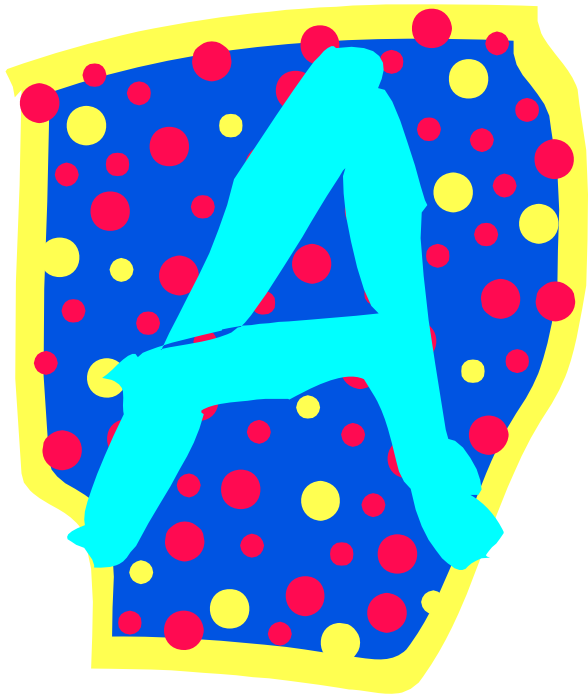


WHAT HAPPENS TO THE SAVINGS?

- Accommodate more students
- Offer more options at the second-year or upper-division level
- Develop distance learning courses and programs
- Decrease time to graduation for students by eliminating academic bottlenecks
- Free up expensive campus space

REDESIGN CHARACTERISTICS

- Redesign the whole course—not just a single class
- Emphasize active learning—greater student engagement with the material and with one another
- Rely heavily on readily available interactive software—used independently and in teams
- Increase on-demand, individualized assistance
- Automate only those course components that can benefit from automation—e.g., homework, quizzes, exams
- Replace single mode instruction with differentiated personnel strategies



Technology enables good pedagogy with large #s of students.

GENERAL BIOLOGY at Fairfield University

- Enhance quality by individualizing instruction
- Focus on higher-level cognitive skills
- Create both team-based and independent investigations
- Use interactive learning environments in lectures and labs
  - to illustrate difficult concepts
  - to allow students to practice certain skills or test certain hypotheses
  - to work with other students to enhance the learning and discussion of complex topics

Memorization vs. Application of Scientific Concepts

Traditional	Redesign
• 7 sections (~35)	• 2 sections (~140)
• 7 faculty	• 4 faculty
• 100% wet labs	• 50% wet, 50% virtual
• $131,610	• $98,033
• $506 cost-per-student	• $350 cost-per-student

- ✓**Content mastery: significantly better performance**
- ✓**Content retention: significantly better (88% vs. 79%)**
- ✓**Course drops declined from 8% to 3%**
- ✓**Next course enrollment increased from 75% to 85%**
- ✓**Declared majors increased by 4%**

LINEAR ALGEBRA at Virginia Tech

- Inconsistent student academic preparation
- Inability to accommodate different student learning styles
- Inadequate student retention
- Inability of students to retain what they have learned (amnesia)
- Inability of students to apply mathematical principles to other disciplines (inertia)
- Lack of uniformity in learning outcomes

THE MATH EMPORIUM at Virginia Tech

Traditional

- 38 sections (~40)
- 10 tenured faculty, 13 instructors, 15 GTAs
- 2 hours per week
- $91 cost-per-student

Redesign

- 1 section (~1520)
- 1 instructor, grad & undergrad TAs + 2 tech support staff
- 24*7 in open lab
- $21 cost-per-student

Replicated at U of Alabama, U of Idaho, LSU, Wayne State, U Missouri-St. Louis, Seton Hall

THE EMPORIUM MODEL
77% Cost Reduction (V1)
30% Cost Reduction (V2)

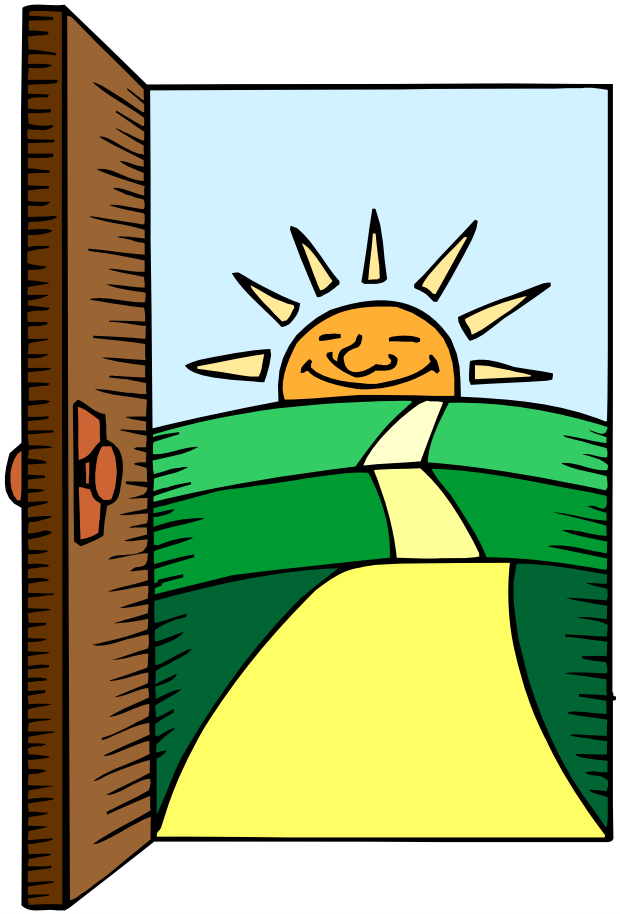
UNIVERSITY OF ALABAMA SUCCESS RATES

• Fall 1998	• 47.1%
• Fall 1999	• 40.6%
• Fall 2000	• 50.2%
• Fall 2001	• 60.5%
• Fall 2002	• 63.0%
• Fall 2003	• 78.9%
• Fall 2004	• 76.2%

WHAT DO THE FACULTY SAY?

- “It’s the best experience I’ve ever had in a classroom.”
- “The quality of my worklife has changed immeasurably for the better.”
- “It’s a lot of work during the transition--but it’s worth it.”

TAKING COURSE REDESIGN TO SCALE



- The Roadmap to Redesign (R2R)
- Lumina Study: Underserved Students
- The Redesign Alliance
- Redesign Programs with Systems and States

FOR MORE INFORMATION

www.theNCAT.org

- Full project plans
- Monographs
- Progress reports
- Planning resources
- Lessons Learned
- Project contacts

The National Center for Academic Transformation