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Independent Analysis, Innovative Ideas

The Course of Innovation: Using Technology to Transform Higher Education

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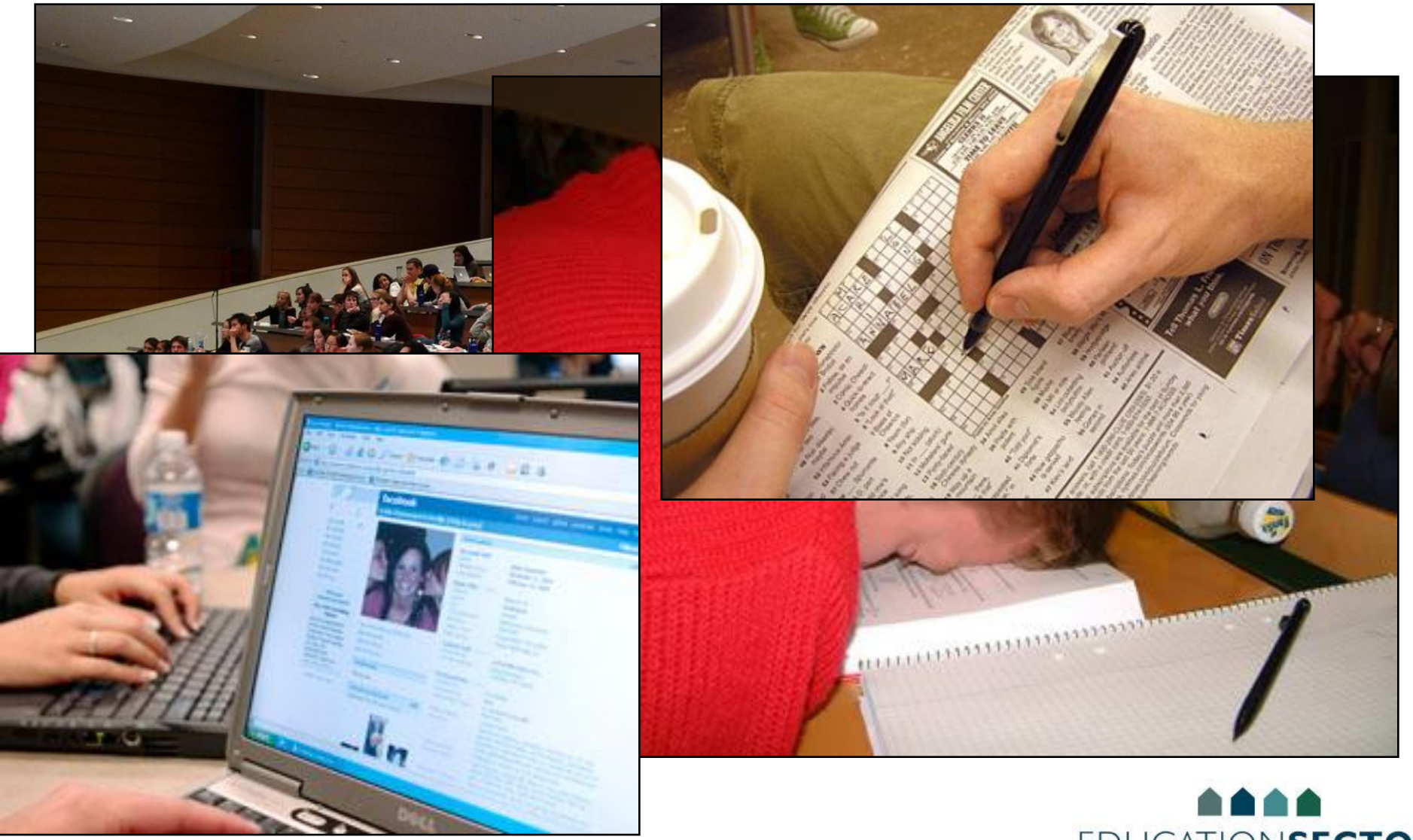
Presentation for the NCSL Annual Legislative Institute on Higher Education

August 16, 2010

Did your state cut its higher education funding in the past two years?

43 states have cut their higher education funding since 2008

The Dreaded 101 Course



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The Dreaded 101 Course

- Large, boring lectures
- Minimal feedback
- One size fits all
- Quality varies

This model doesn’t work

- Students master less than 30% of lecture material
- Students don’t study
- Remedial students have low success rates
- Stagnant graduation rates
- Costs increases continue unabated

There is a solution

Course Redesign

Course redesign means transforming large introductory courses using technology to improve student learning and reduce costs.

Characteristics of redesigns

- Entire course
- Targeted use of technology
- More student involvement
- Greater assistance
- Broken into pieces
- Costs and learning are measured

Course Redesign is NOT

- Online slides or lecture notes
- Faceless, non-interactive online instruction
- Leaving students alone in a lab

An example

Introductory math at the University of Idaho

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U of Idaho

Problem: 21% of students failed or withdrew from their introductory math courses. Only 62% passed with a “C” or better.

The solution: A Math Emporium

What is a Math Emporium?

- Started at Virginia Tech
- Learn math by doing math
- Lab, not lecture
- Flexible
- On-demand tutoring

U of Idaho's Math Emporium

- 1 Class Meeting a week
- 2.5 Hours in the Lab

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What happens in the lab

- Students use online workbook to learn material

R.1 Real Numbers

R.:

OBJECTIVE 2: WRITING SETS USING SET-BUILDER NOTATION AND INTERVAL NOTATION

Set-builder notation can be a convenient way to describe certain sets of numbers. For example, we used set-builder notation to describe the set of rational numbers and the set of irrational numbers. Suppose that we want to describe the set of all real numbers less than 10. Using set-builder notation, we write this set as $\{x|x < 10\}$. This set is read as "the set of all x such that x is less than 10." Figure 3 illustrates how we can represent this set on a number line.

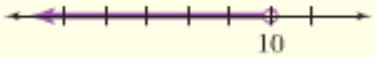

Figure 3 The set $\{x|x < 10\}$ represented on a number line.

The open circle (○) at the number 10 in Figure 3 represents that 10 is *not* included in the set. If we wanted to include the number 10, we would have used a solid circle (●). The arrow extending to the left indicates that the set goes on indefinitely toward negative infinity. In this text, we often use **interval notation** to describe sets of numbers such as the set displayed in Figure 3. The interval that describes this set is called an open infinite interval and is written as $(-\infty, 10)$. It is extremely important to be able to write intervals of numbers in both set-builder notation and interval notation. Table 1 illustrates the different types of intervals and the corresponding set-builder notation.

You Try It

R.1-8

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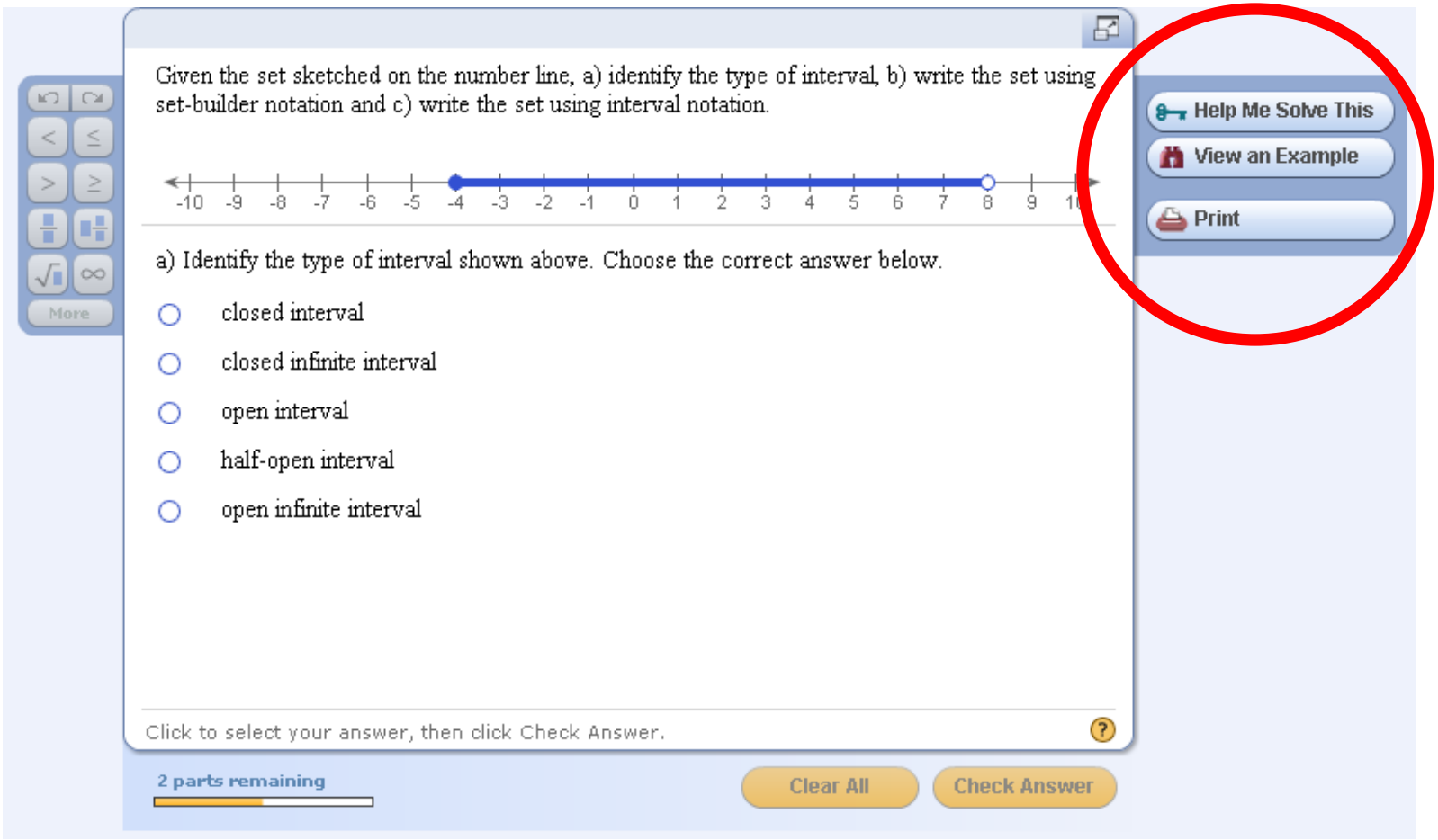
What happens in the lab



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On-demand tutoring

- Small live lectures

Idaho Results

- Passage rates increased from 62% to 70%
- Failure/withdrawal rates down 20%
- 30% Per-Student Cost Savings
- $1 million+ over eight years
- Consistent with other redesigns

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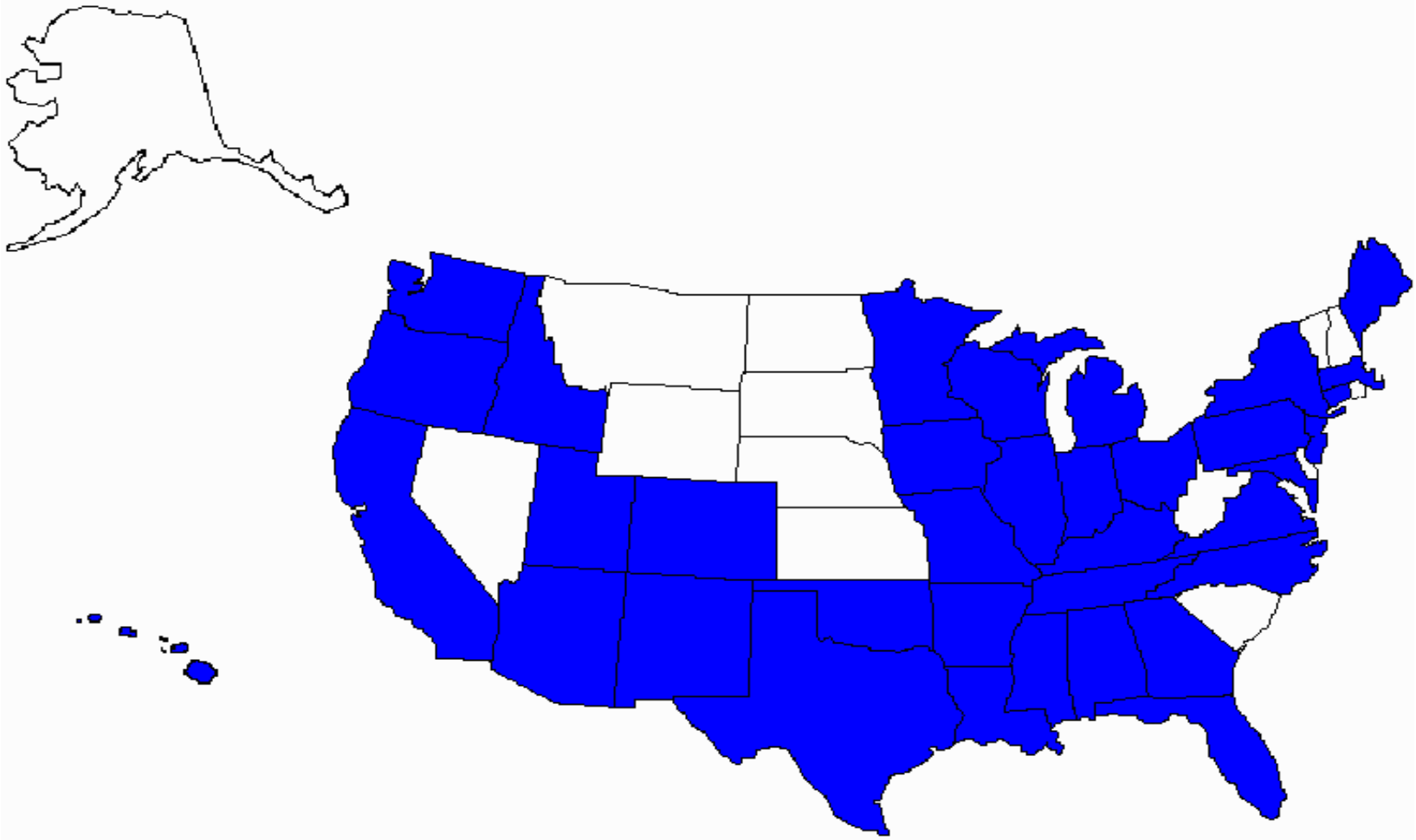
Results from other projects

- **Austin Peay:** The percentage of remedial-level students passing a for-credit math course increased from 30% to 67%
- **Tallahassee CC:** Essay scores in a writing course improved and it saved over $320,000
- **Frostburg State:** Exam scores in a general psychology course increased by 12 percentage points

34 states have tried at least one redesign



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All types of colleges

- Prestigious Privates
- Public flagships
- Community Colleges

All types of courses

- Math
- Spanish
- Composition
- Psychology
- Remediation
- Public Speaking
- Geology
- Biology
- Statistics
- Chemistry

Potential Difficulties

- Mixed student reaction
- Requires active maintenance
- Hard to calculate capital costs
- Long-term measurement of student learning
- Initial faculty pushback
- Limited direct student savings

Role for State Policymakers

- Statewide redesign initiative
- Startup costs
- Encourage collaboration
- Reward student success
- High school to college linkage

For more information, visit the Education Sector website at:

http://www.educationsector.org

Or e-mail me at:

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Example redesigns in your state

Maine

- U. of Southern Maine—Introductory Psychology

Maryland

- Frostburg State U.—General Psychology

Michigan

- Wayne State U.—Beginning Algebra

New Mexico

- U. of New Mexico—General Psychology

Questions?