

COURSE REDESIGN – PARADOX OR NEW PARADIGM FOR STANDARDS- BASED MATH?

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Panelists



- Judy E. Ackerman
- Robert L. Carson
- Byron A. Dyce
- Susan M. Knights
- Stephanie Pepin

Quick History of Course Redesign



- Goal of Course Redesign is to improve student learning and reduce costs
- Program in Course Redesign, Pew Charitable Trusts (1999 – 2003)
- Roadmap to Redesign, R2R, FIPSE (2003 – 2006)
- Colleagues Committed to Redesign, C2R, FIPSE (2006 – 2009)

Quality Improvement Techniques



Quality Improvement Techniques, Round I

- ❑ Continuous Assessment and Feedback
- ❑ Increased Interaction among Students
- ❑ Online Tutorials
- ❑ Undergraduate Learning Assistants

Additional Quality Improvement Techniques, Round II and Round III

- ❑ Individualized, On-demand Support
- ❑ Structural supports that Ensure Engagement and Progress

Cost Savings Techniques



- ❑ Online Course Management Systems
- ❑ Online Automated Assessment of Exercises, Quizzes and Tests
- ❑ Online Tutorials
- ❑ Shared Resources
- ❑ Staffing Substitutions
- ❑ Reduction of Space Requirements
- ❑ Consolidation of Sections and Courses
- ❑ Lower Cost Course Materials

Redesign Institutional Readiness Criteria



1. Desire to control or reduce costs and increase academic productivity.
2. Demonstrated commitment to use technology to achieve strategic academic goals.
3. Computing firmly integrated into the campus culture.
4. Technology used for functions previously performed by personnel for administrative functions and/or academic functions.
5. Mature information technology (IT) organization(s) to support faculty integration of technology into courses.
6. Demonstrated commitment to learner-centered education.
7. Commitment to learner readiness to engage in IT-based courses.
8. Commitment to providing needed support for the redesign project.

National Center for Academic Transformation, 2005, <http://www.center.rpi.edu/PlanRes/Readiness.htm>

Redesign Course Readiness Criteria



1. Changes in the course will have a high impact on the curriculum.
2. Decisions about curriculum in the department, program, or school are made collectively, not by individual faculty members.
3. Faculty are able and willing to incorporate existing curricular materials in order to focus work on redesign issues rather than materials creation.
4. Faculty members have an understanding of and some experience with integrating elements of computer-based instruction into existing courses.
5. Course learning outcomes and a system for measuring their achievement been identified.
6. Project participants have the requisite skills to conduct a large-scale project.
7. Faculty members involved in project have an understanding of learning theory.
8. Campus is committed to a partnership among faculty, IT staff and administrators in planning and execution of the redesign.

Six Models for Course Redesign



- ❑ Supplemental Model
- ❑ Replacement Model
- ❑ Emporium Model
- ❑ Fully Online Model
- ❑ Buffet Model
- ❑ Linked Workshop Model

National Center for Academic Transformation, 2005, http://www.center.rpi.edu/PlanRes/R2R_ModCrsRed.htm

Stephanie Pepin

Montgomery College

Intermediate Algebra for Liberal Arts

Supplemental Model



Before Course Redesign



- 32 sections fall 2006
- Approx. 28 sections Spring 2007
- 1800 students annually 2007 - 2008
- Traditional, lecture based classes
- Taught entirely by FT and PT instructors

Problems



- ❑ Teacher centered
- ❑ Insufficient support for multiple learning styles
- ❑ Inconsistent coverage of topics
- ❑ No flexibility in instructional pace
- ❑ Lack of student success
 - D/F/W rates as high as 55*%
- ❑ Very high course repeat percentage
- ❑ Negative impact on student retention
- ❑ Significant drain on resources

Identify an alternative structure that

- has faculty/instructor/staff support
- is learner centered
- supports multiple learning styles
- provides consistent presentation and assessment of material
- allows students to work at own pace*
- increases student success
- reduces resource demands

Proposed Approach



- “Substitution” Model
- Retains basic structure of the traditional course; supplementing with technology based activities to encourage greater student engagement with course

Pending Modifications



- 30-50 minute “classes” that introduce students to topics and integrate the topics into the overall course objectives
- 3-4 hours in dedicated Math* Learning lab or elsewhere working independently using course software that presents a series of topics covering specific learning objectives
- Redesign of current computer lab

Advantages of New Format



- Learner centered
- Software supports multiple learning styles
- Consistent presentation of material
- Individualized tutorial support available

More Advantages



- Students can work at own pace*
- Students can work in lab or at home
- Software provides instant feedback on work
- Homework, quizzes, tests/exams* computer graded
- Software records all student activity

Implementation Issues



- “No Teacher” Syndrome
- Student Engagement
- Scheduling Deadlines, Tests, Etc.
- Instructor perceived “Loss of Control”
- Staff Scheduling
- Data Management / IT support
- Instructor Buy-In
- Instructor Training

Pass Rate in next courses

Rockville	Grade in MA 110				
Grade in MA 101	A	B	C	D,F,W,I	# of Students
A	52.9%	29.4%	0.0%	17.7%	17
B	11.5%	61.5%	19.2%	7.6%	26
C	4.0%	20.0%	40.0%	36.0%	25
Total	18.8%	37.7%	21.7%	21.7%	68

Rockville	Grade in MA 116				
Grade in MA 101	A	B	C	D,F,W,I	# of Students
A	17.6%	29.4%	29.4%	23.6%	17
B	8.3%	25.0%	16.7%	50.0%	12
C	5.3%	5.3%	42.1%	47.4%	19
Total	10.4%	18.8%	31.3%	39.6%	48

	Grade in MA 110				
MA 101 Grade	A	B	C	D,F,W,I	# of Students
A	50.0%	18.8%	12.5%	18.7%	32
B	16.7%	58.3%	16.7%	8.3%	36
C	4.5%	15.9%	36.4%	43.2%	44
Total	21.4%	30.4%	23.3%	25.0%	112

	Grade in MA 116				
Grade in MA 101	A	B	C	D,F,W,I	Total Number of Students
A	28.6%	26.2%	23.8%	21.4%	42
B	9.8%	39.0%	17.1%	34.1%	41
C	5.4%	8.9%	26.8%	58.9%	56
Total	13.7%	23.0%	23.0%	40.3%	139

Additional information



- Data Set #1 - Students enrolled in MA 101 in Fall 07 for whom assessment data from the common final exam was available,
- Data Set # 2 - All students enrolled in MA 101 in Fall 07, regardless of whether assessment data from the common final was available.
- Data Set # 3 - All students who passed MA 101 in Fall 06, prior to the course redesign of MA 101, and who subsequently enrolled in either MA 110 or MA 116 in Spring 07.

Additional Information continued

- From Data Set #1
 - Nearly 40% of the students who passed MA 101 with a C or better do *not* enroll in a math course the following semester.
 - 43% of the students who achieved a C or better in MA 101 were unable to successfully complete their math course the following semester.
 - Students did poorly on the combined four questions on the common final for which data was collected.
 - Nearly 80% of the students who achieved a C or better in MA 101 were able to successfully complete MA 110 the following semester.
 - Approximately 60% of students who passed MA 101 were able to successfully complete MA 116 the following semester.
- From Data Set #2,
 - 43% of the students who achieved a C or better in MA 101 were able to pass MA 116 the following semester.

“Must Haves” for Redesign



- ❑ The support of both the department administration and upper administration.
- ❑ A strong-willed director/course coordinator.
- ❑ A core group of instructors and professors dedicated to working hard to make course redesign work.
- ❑ Space and computers for a learning lab.
- ❑ A willingness on the part of everyone involved to be flexible and CHANGE.
- ❑ A purpose and an overall plan for change.

Next Steps for spring 2009



- Identifying funds/resources for fall 2009 pilot for MA09,1 Elementary Algebra
- Computer lab redesign
- Alternate software selection and training

Pending Issues



- How much change?
- Redesign model to include mandatory lab?
- Faculty workload distribution questions
- Availability of technology resources on all three campuses

Conclusions



- ❑ Redesign process is unique to each college
- ❑ Pilot sections will offer insight as to modifications necessary for full implementation.
- ❑ Technology is a fundamental key to redesign success

Byron Dyce

Santa Fe Community College

Pre-Algebra through College Algebra



Robert Carson

Hagerstown Community College

College Algebra



College Algebra Redesign Project

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The National Center for
Academic Transformation

www.thencat.org

- Colleagues Committed to Redesign (C2R)
- Provides support and expertise to institutions redesigning course delivery to
 1. Increase use of technology to improve student learning and
 2. Reduce cost of course delivery / student
- Funded by FIPSE Grant: October 2006 – September 2009

Fall 2007 MAT 101



- ❑ 3 Sections of the Redesign Model
- ❑ 1 Online Section
- ❑ 10 Sections of the Traditional Lecture
- ❑ All Sections took a 25 point common assessment

Redesign Sections Fall 2007

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- Each section of 24 students had:
 - 1.5 hrs of lecture each week
 - 1.5 hrs with specialized software each week with the instructor available for individualized instruction
 - Access to mathematics tutors in math lab
- Each week students completed homework assignments
- Testing was done in the testing center

Grading

33

- 10% - Homework Assignments (27)
- 10% - Quizzes (8)
- 10% - Participation (attendance, etc.)
- 40% - Exams (4 tests)
- 25% - Final Exam
- 5% - Instructor Material (individualized assessment from instructor)

Results We Noticed

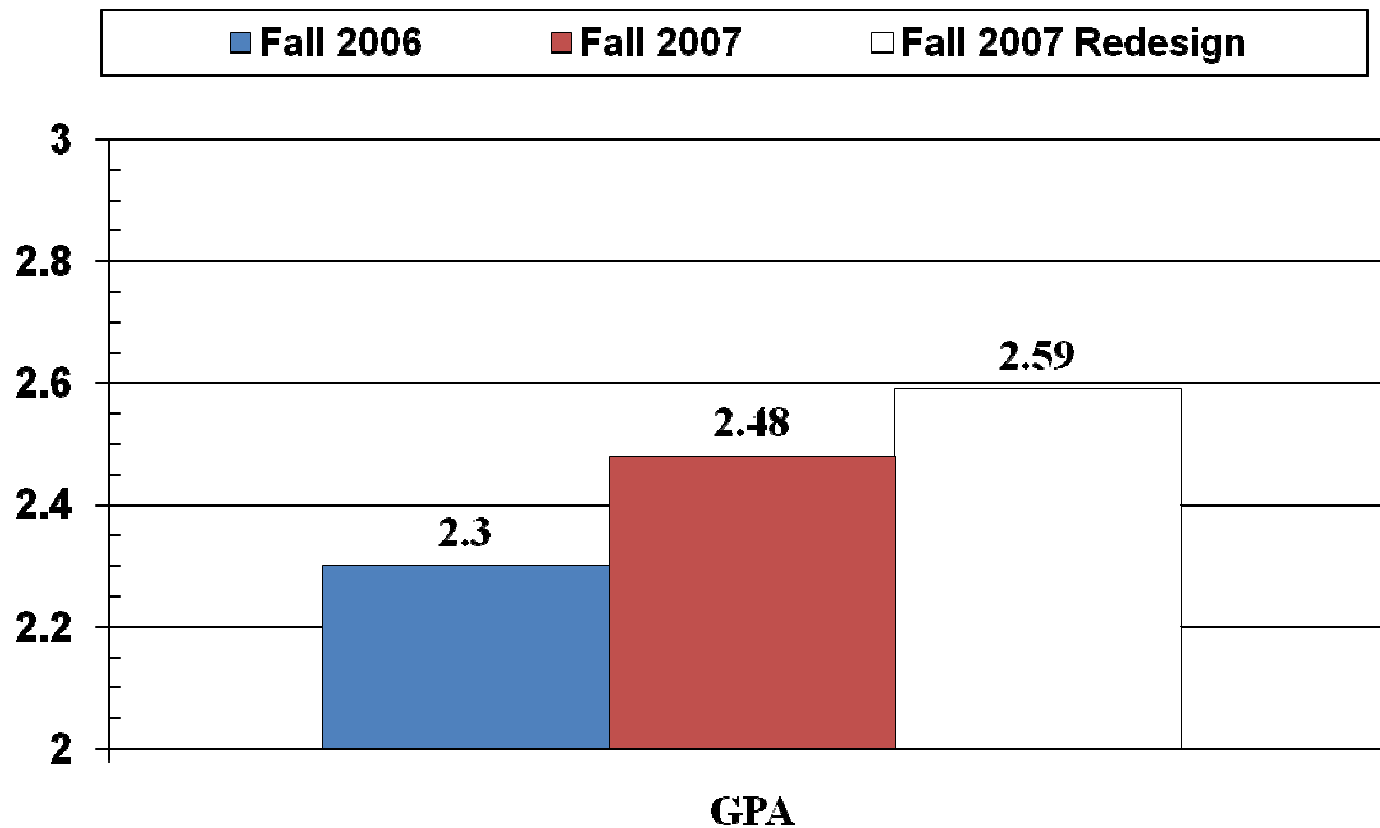
34

- ❑ Students with grades of C or higher averaged at least 45 hours on the online portion of the class
- ❑ Students were doing the homework
- ❑ Attention to details and not following directions were the major problems with the student software interface.



Changes in Mean College Algebra Course Grade

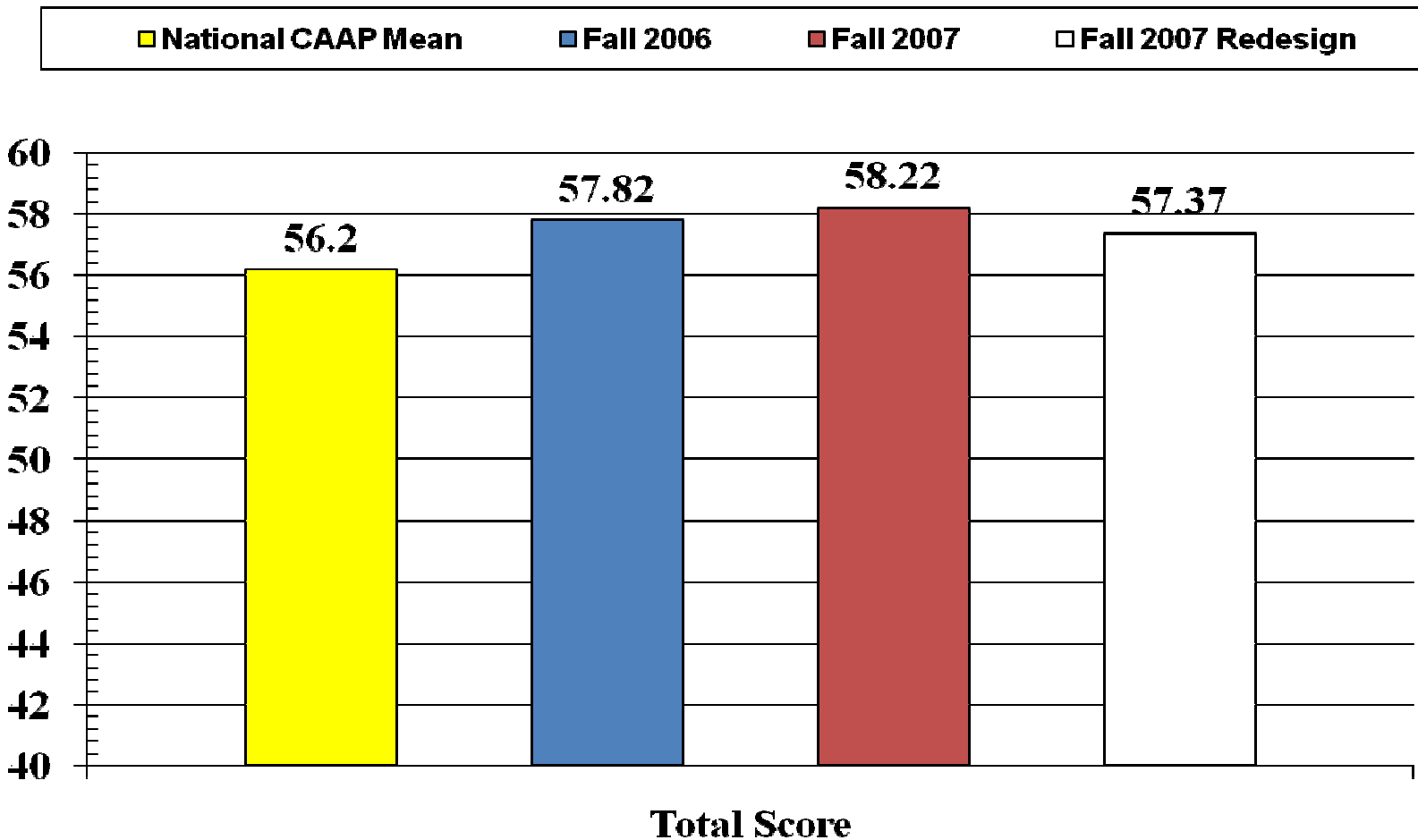
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Mathematics

CAAP Scores (out of 80)

36



Spring 2008

37

- Combined section of 40 students in lecture
- Met with groups of 20
 - For specialized software with individualized instruction
 - For 2.5 hrs weekly
- All College Algebra students used the redesign model
- 7 sections were taught with redesign model (section max 40)
- 3 sections taught totally online (section max 20)
- Common examinations

College Algebra: Effect of Redesign On Institutional Data Measures

Table 2

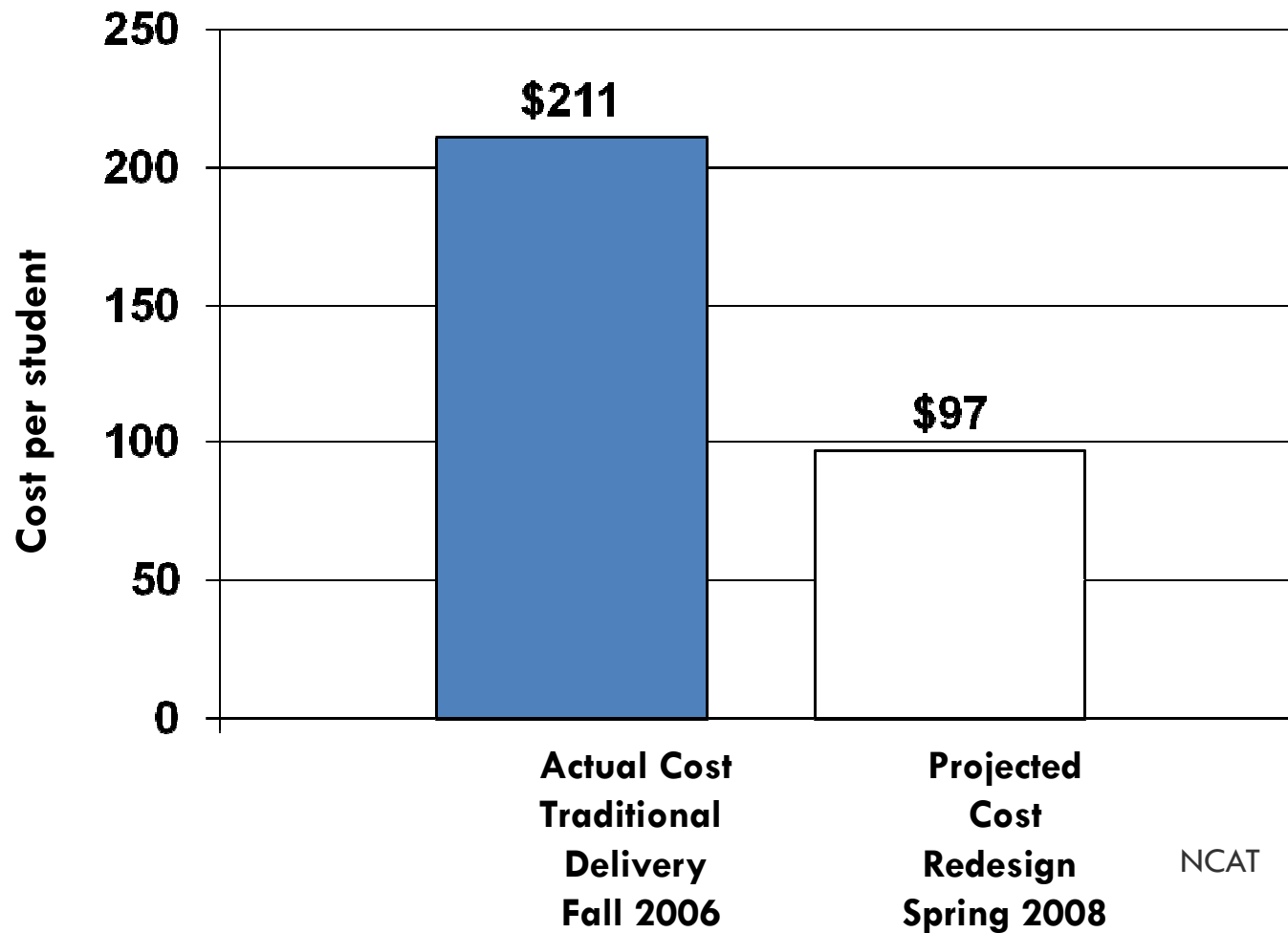
	% W	% No-show Fs	% Success (A,B,C)	% Difference
Fall 2007 (n=309) Traditional	8.0	12.3	62.3	+14.5% vs. Fall 2007
Fall 2007 (n=71) Redesign Pilot	5.6	7.0	73.6	
Sp 2007 (n=257) Traditional	12.5	12.8	58.4	+16.4% vs. Spring 2007 +19.1% vs. NCCBP
Sp 2008 (n=265) Redesign	6.7	11.7	68.0	
NCCBP	21.9		57.1	

Cost of Instruction per student

Traditional vs. Redesign

(Does not include facilities or computer resources)

39

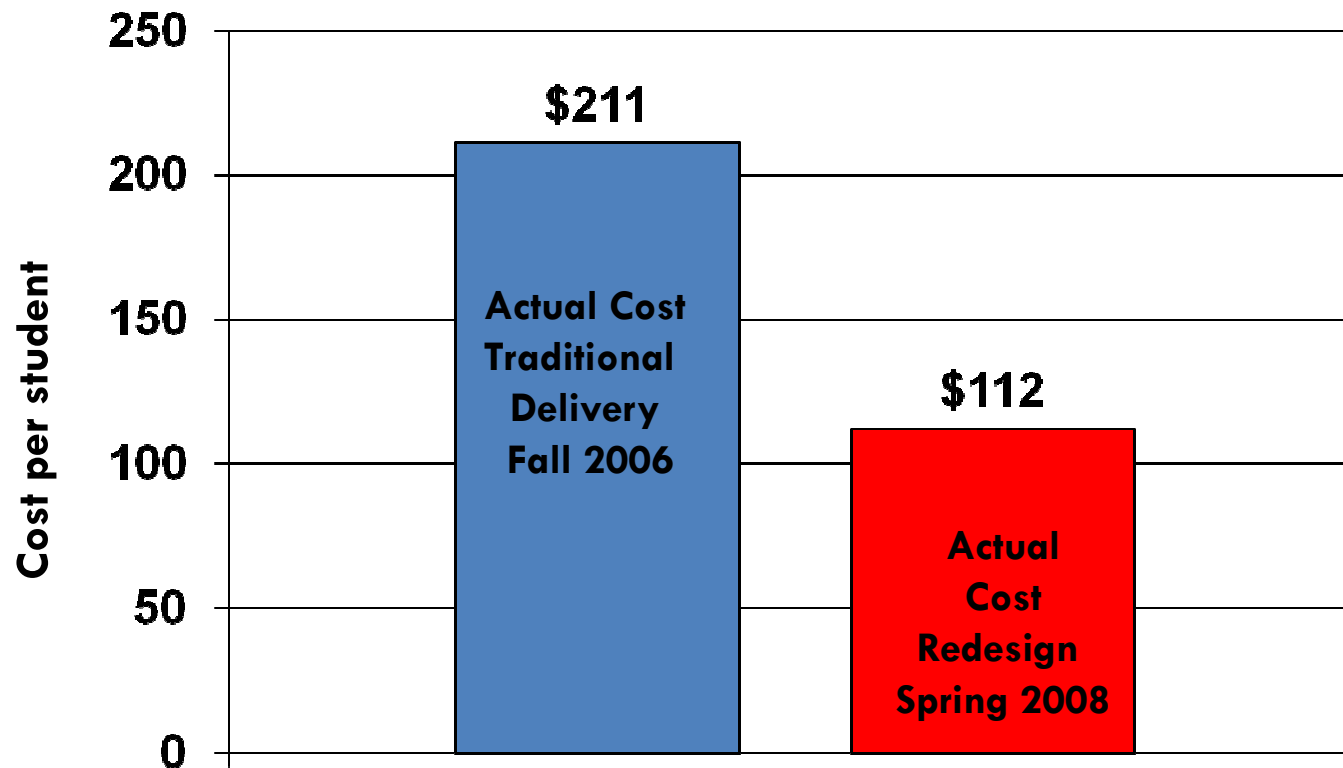


Cost of Instruction per student

Traditional vs. Fully-implemented Redesign

(Does not include facilities or computer resources)

40



Design for Fall 08

41

- Four hour concept
- Combined section of 40 students for 1.5 hrs. weekly lecture
- Meet with group of 20
 - For specialized software with individualized instruction
 - For 1.5 hrs weekly
- Students required to go to open lab to do an additional 1 hour of work online

Susan Knights

Boise State University

Developmental Math Program

Emporium Model

with mandatory attendance

Institution's Goals



- Uniform Curriculum
 - Consistent material
 - Identical weekly homework and quizzes
 - Common quarterly exams
 - Common final
 - Grading rubrics
- Space Issues
 - Return of the math bldg to the math dept
 - Addition of 3000 sq ft MLC

Results to Date

□ Student Learning

- Increased course completion rate ~45% to ~70%
- Increase in independent learners
- Every learning style accommodated

□ Costs

- First 3 Years
 - Hybrid instructors paid 1.5 credits plus hourly lab time
- 3rd - 6th Year
 - Addition of 8-12 graduate students as instructors
- 7th Year
 - Hybrid instructors paid flat fee for 1 hour class + 3 hour lab

Lessons Learned



□ Obstacles

- Lack of communication and lack of a common goal
- Educating faculty and advisors in other departments
- Getting students to change their concept of their role in the learning process

□ Positive Surprises

- Decrease in number of students repeating courses
- Increase in student-teacher communication
- Intercollegiate communication among developmental faculty
- Students looking for redesigned courses for the next level

Next Steps



??????????

QUESTIONS

