COLLEGE ALGEBRA
REDESIGN AND THE
AMATYC CROSSROADS
STANDARDS

Laura Younts
Professor of Mathematics
Santa Fe College
Our Story

- College Algebra Redesign Team formed in Spring, 2009

- Goal – increase student success rates by promoting active student learning
First priority

- Achieve and maintain faculty support
  - Open and constant communication
  - Seek and consider all faculty input
  - Seek departmental approval at every turn
  - Constant assessment of goals and objectives
PART I: BACKGROUND RESEARCH

- Common course outline vs. state specs
- Generation Y research
- Redesign projects at other schools
- Evaluation of current course
- Recommendations of AMATYC and other professional organizations
AMATYC Standards for Intellectual Development

Students will…

- Engage in substantial mathematical problem solving
- Learn through modeling real-world situations
- Expand mathematical reasoning skills as they develop mathematical arguments
- Connect Math to other disciplines
AMATYC Standards for Intellectual Development

and...

- **Communicate mathematics** (read, write, listen to, speak)
- **Use appropriate technology to** enhance thinking, solving, judging
- **Engage in experiences that encourage independent, nontrivial exploration**
- **Translate among numerical, graphical, symbolic & verbal** representations
Wow!
HOW DO WE GET OUR STUDENTS DOING ALL OF THIS?!?!?

We follow the…

The AMATYC Standards for Pedagogy

“Students should understand Mathematics as opposed to performing memorized procedures.”
AMATYC Standards for Pedagogy

Mathematics faculty will...

- Model the use of *appropriate technology*
- Foster *interactive learning* through student writing, reading, speaking, and collaborative activities
- Involve students in *meaningful mathematics problems*
and...

- Use *multiple instructional strategies* (interactive lectures, guided discovery, questioning, collaboration, etc.)
- Provide learning activities that promote **independent thinking** and require **sustained effort**
WOW AGAIN!
How do we do all of this?

- What specific strategies do we use?
- How do we train/help faculty to do all of this? How do we get them to “buy in?”
- How do we find the time to do all of this?
MORE QUESTIONS...

- Will this require **too much paper grading**?
- How can we expect our **adjuncts** to do all of this?
- What will our redesigned **classroom** actually **look** like?
PART II: THE SPECIFICS

- List of ideas – focus on top choices
- Choose a textbook
  - Interface with course goals
  - Topical coverage
  - Learning management system
  - Student-friendly
  - Customizable
THE SPECIFICS (CONT’D)

- Common final exam that assesses the standards
- Activities & projects “pool” - shared & accessible – our best – your best
- Determine specific classroom components
**CLASSROOM COMPONENTS:**

1. Common topical/sectional coverage
2. Real-world introductions for major topics
3. Common online assessments
4. Cooperative learning activities & projects
5. Emphasis on applications & multiple approaches to problem solving
6. Carefully planned, interactive lectures
7. Common grading scale & final exam
PART III: SUPPORT FOR FACULTY

- Professional development
- Orientations
- Mentors
- Detailed topical outline (learning objectives, applicable text pages & exercises, notes)
- Sample syllabi with daily schedule
SUPPORT FOR FACULTY (CONT’D)

- Activities & projects pool - accessible location
- Sample introductions for major topics
- LMS master course with online homework & quizzes, ready-to-use
- Sample daily outlines (detailed for 50-minute & 75-minute class periods)
- Instructor Resource Manual
I. Components of redesigned classroom
II. Sample syllabi *(including timelines for 2 days/wk & 3 days/wk)*
III. What to cover from textbook *(sections, reading assignments, exercises & suggested activities & projects)*
IV. Real-world introductions to major topics
V. Using multiple points of view to problem solve
VI. Guidelines for using activities & projects
VII. Sample activities & projects
VIII. Getting started with the LMS
IX. Rationale for assigning graded homework
X. Common final exam general information
XI. Common final exam skills list
RESOURCE MANUAL (CONT’D)

XII. Graphing calculator skills list
XIII. Scatter plot & regression instructions
XIV. Sample tests
XV. Interpreting and writing about mathematics
XVI. Common course outline
XVII. Course goals (from the MAA/CUPM subcommittee, Curriculum Renewal Across the First Two Years)
RESOURCE MANUAL (CONT’D)

XVIII. AMATYC’s Crossroads Standards for Pedagogy

XIX. Other resources (College Algebra Redesign Team contact info, S-drive, etc.)
PART IV: IMPLEMENTATION PROCESS

First phase:

- Pilot ten sections
- Continue developing and refining resources
- Institute common final exam
IMPLEMENTATION PROCESS
(CONT’D)

Second phase:

- Analyze exam results
- Continue developing/refining resources
- Continue to train more faculty & increase # of redesign sections
- Provide mentoring for faculty
- Analyze success data
- Analyze residual data
<table>
<thead>
<tr>
<th></th>
<th>Percent Passing Final Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Redesign</td>
</tr>
<tr>
<td>Fall 2010</td>
<td>58.0%</td>
</tr>
<tr>
<td>Spring 2011</td>
<td>58.6%</td>
</tr>
<tr>
<td>Fall 2011</td>
<td>58.2%</td>
</tr>
<tr>
<td>Spring 2012</td>
<td>47.9%</td>
</tr>
<tr>
<td></td>
<td>Overall Success Rates</td>
</tr>
<tr>
<td>------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td></td>
<td>Redesign</td>
</tr>
<tr>
<td>Fall 2010</td>
<td>61.9%</td>
</tr>
<tr>
<td>Spring 2011</td>
<td>58.5%</td>
</tr>
<tr>
<td>Fall 2011</td>
<td>61.3%</td>
</tr>
<tr>
<td>Spring 2012</td>
<td>51.5%</td>
</tr>
<tr>
<td></td>
<td>Overall Retention Rates</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td></td>
<td>Redesign</td>
</tr>
<tr>
<td>Fall 2010</td>
<td>81.6%</td>
</tr>
<tr>
<td>Spring 2011</td>
<td>83.5%</td>
</tr>
<tr>
<td>Fall 2011</td>
<td>86.2%</td>
</tr>
<tr>
<td>Spring 2012</td>
<td>82.5%</td>
</tr>
<tr>
<td>Residual Data: Fall, 2011 to Spring, 2012</td>
<td>Redesign</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>P(A, B or C in PreCalc, Trig, Survey Calc given A, B or C in Col. Alg.)</td>
<td>81.9%</td>
</tr>
<tr>
<td></td>
<td>75.1%</td>
</tr>
<tr>
<td></td>
<td>(With W’s &amp; I’s)</td>
</tr>
</tbody>
</table>
IMPLEMENTATION PROCESS (CONT’D)

Third phase (now!):

- FULL redesign (58 sections) this fall
- Continue with…
  - Data analysis
  - Professional development
  - Activity/project development
- Revisit AMATYC’s Standards
Any questions?

Recommended website: beyondcrossroads.amatyc.org/

Contact info: Laura.Younts@sfcollege.edu