Math Emporium Redesign

Using the Force of High-Technology for the Good of High-Touch Teaching and Learning

January 28, 2013
EPCC Presenters

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Board Member, District 5

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Interim Vice President of Instruction

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Dean, Health Careers, Math & Science

Lucy Michal
Professor of Mathematics

2013 Bellwether Finalist
Presentation Overview

- Who is El Paso Community College?
- Using data...Math Emporium evolves
- Gathering support for implementation
- Implementing high-tech, high-touch course redesign
- Modifying faculty roles - professional development
- Logistical challenges
- Scaling and sustaining high-technology, high-touch classrooms
- Collecting student success data

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Dr. Carmen Olivas Graham
Board of Trustee
District 5
2013 Bellwether Finalist
Five EPCC Campuses

Northwest Campus

Valle Verde Campus

Mission del Paso Campus

Rio Grande Campus

Transmountain Campus

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Who is EPCC?

- Established in 1969 (serves El Paso and Hudspeth Counties)
- Curriculum - traditional credit transfer, workforce programs, ESL and continuing education
- Awards – AA, AS, and AAS Degrees and one-year certificates

<table>
<thead>
<tr>
<th></th>
<th>FALL 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enrollment</td>
<td>30,392</td>
</tr>
<tr>
<td>Female</td>
<td>57%</td>
</tr>
<tr>
<td>Male</td>
<td>43%</td>
</tr>
<tr>
<td>Economically Disadvantaged</td>
<td>55%</td>
</tr>
<tr>
<td>Predominantly Hispanic</td>
<td>85.5%</td>
</tr>
<tr>
<td>Majority of Students</td>
<td>Under age of 30</td>
</tr>
<tr>
<td>DE Mathematics Enrollment</td>
<td>5,629 (18.5%)</td>
</tr>
</tbody>
</table>
Gathering Support

- District-wide mathematics faculty/counselors and student services support
- EPCC College-wide support
  - Institutionalized tutor funding
  - Facilities at every campus
- Administrative and Trustee support
Lucy Michal
Professor of Mathematics
2013 Bellwether Finalist
EPCC Initiatives

- Achieving the Dream: Community Colleges Count
- Developmental Education Initiative
- Community College Developmental Education Initiative (THECB Managing Partner)
- Texas Developmental Education Demonstration Project
- Carnegie Statway National Collaboratory
- Complete College America
- New Mathways Project
Using Data

- Culture of Evidence Initiated at EPCC by Achieving the Dream (ATD)
- Developmental Education Mathematics Standing Committee formed
  - Faculty used mathematics placement data to guide their work
Fall 2003 Mathematics Placement Data

Source: EPCC Banner

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Math Emporium Evolves

- **2003-2008** - ATD focus area – EPCC pilots math emporium to accelerate DE math experience for students

- **January 2009** - EPCC commits to redesign Mathematics DE Courses with funding from National Center for Academic Transformation

- **2009-2012** - DEI provides funding and time needed to scale math emporium offerings
EPCC’s Math Emporium

DE Math Standing Committee

- Restructured four DE math courses into three
- Researched NCAT College’s redesigned courses
- Selected two software programs to evaluate
- Analyzed student outcome data
- Selected one software to use district-wide
Scaling and Funding for Sustainability

Technology Funded By
- Developmental Education Initiative (DEI) (funded by the Bill and Melinda Gates Foundation)

Facilities Funded By
- Mission del Paso Campus (EPCC reconstruction)
- Northwest Campus (EPCC reconstruction)
- Rio Grande Campus (EPCC renovated old bakery)
- Transmountain Campus (EPCC new construction, partially grant funded)
- Valle Verde Campus (EPCC new construction)
Implementing a Math Emporium

**Students**

- Register for one of three courses offered in math emporium sections
- Meet with instructors three hours a week
- Have in-class tutors
- Have 24 to 35 classmates
- Are in a 12:1 ratio learning environment (12 students to one teacher/tutor)
High-technology learning resources transform lecture classes into active classrooms where students

- Take diagnostic pretest
- Self-accelerate their work
- Learn topics at a mastery level
- Hear mini-lectures (when needed)
- Have access to instructors and in-class tutors
- Receive “just-in-time” teaching
Implementing...

High-touch learning resources transform our syllabi into syllabi describing:

- Clear, active student expectations
- Embedded study skills
- Self-accelerated timelines
- Goals for working in class and at home

All learning activities and work are used to form a student’s course grade.
High-Touch Teaching and Learning

Built-in student success skills and activities

- Clear expectations with accountability
- Required notebook
- Self-progress reports
- Mandatory attendance
- Required reviews and interventions before exams
- In-class tutors
- Other faculty for added support

Mission del Paso Campus
Math Emporium
How do students self-accelerate their work?

- Take diagnostic exam and identify deficiencies
- Build knowledge using notebook and learning resources
- Complete homework using learning resources
- Reviews and takes assessment (during class time)
- May re-assess or goes on to the next unit
- Finishes all units, reviews, takes the final
- Goes on to the next course
Dr. Paula Mitchell
Dean
Health Careers, Math and Science
Some Challenges...

Changing Role of the Faculty

Changing Role of the Student
Changing the Role of the Faculty

Faculty Now...

- Provide mini-lectures
- Connect individually with every student
- Mentor/advise/guide students daily, weekly
- Communicate student progress daily, weekly
- Anticipate and address difficult topics
- Encourage students daily, weekly
Professional Development

**Technology Training**
- Using software
- Using learning resources

**Pedagogy**
- Changing roles for faculty and students
- Sessions during Faculty Development Week
- DEI Institutes – Summer and Fall 2012, faculty stipends
Changing the Role of the Students

Students Now...

- Organize course notebook the first day of class
- Work homework in class and outside of class
- Use learning resources, takes notes, works homework
- Know to ask for help, get “just-in-time” help
- Take password protected exams during class time
- Self-accelerate to finish more than one course
- Learn self-accountability
How Do Students Self-Accelerate Their Work?

<table>
<thead>
<tr>
<th></th>
<th>Early Completers</th>
<th>Start 2(^{nd}) Course</th>
<th>Finish 2(^{nd}) Course</th>
<th>Start 3(^{rd}) Course</th>
<th>Finish 3(^{rd}) Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 2011</td>
<td>41</td>
<td>41</td>
<td>10</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Spring 2012</td>
<td>55</td>
<td>52</td>
<td>6</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Summer 2012</td>
<td>15</td>
<td>15</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Fall 2012</td>
<td>77</td>
<td>77</td>
<td>40</td>
<td>2</td>
<td>-</td>
</tr>
</tbody>
</table>
Collecting Student Success Data

Evidence of Improvement

- Retention in lowest level math
- Completion rates in college level
- Courses
Retention Rates: Fall 2010
Students in Level 1 DE Math

Fall to Spring
- Math Emporium: 54%
- Traditional: 55%

Fall to Fall
- Math Emporium: 40%
- Traditional: 28%

Fall 2010 Math Emporium: 109
Fall 2010 Traditional: 1,725

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Completion Rates of Fall 2010 Cohort of Students Who Enroll in College Level Math Courses Within 2 Years – By Entry Level

Completion rates for Fall 2010 Cohort students who enroll in college level math courses within 2 years, broken down by entry level and course:

- **Math Emp:**
  - MATH 0301: 42%
  - MATH 0303: 62%
  - MATH 0305: 95%
  - ALL: 78%

- **Traditional:**
  - MATH 0301: 64%
  - MATH 0303: 47%
  - MATH 0305: 65%
  - ALL: 61%

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### Qualitative Data

#### 9. If you knew you were enrolling in a math emporium course, why did you enroll?

<table>
<thead>
<tr>
<th>Response</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>I did not know I was enrolling in a Math Emporium</td>
<td>31.5%</td>
<td>17</td>
</tr>
<tr>
<td>counselor recommended</td>
<td>16.7%</td>
<td>9</td>
</tr>
<tr>
<td>course was scheduled at a convenient time</td>
<td>13.0%</td>
<td>7</td>
</tr>
<tr>
<td>instructor recommended</td>
<td>3.7%</td>
<td>2</td>
</tr>
<tr>
<td>like to work at my own pace</td>
<td>25.9%</td>
<td>14</td>
</tr>
<tr>
<td>student recommended</td>
<td>7.4%</td>
<td>4</td>
</tr>
<tr>
<td>wanted to finish more than one math class per semester</td>
<td>1.9%</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: TX Developmental Education Demonstration Project Survey – Spring 2012
### Qualitative Data

**26. The notebook was useful in helping me complete the course objectives.**

<table>
<thead>
<tr>
<th>Response</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>44.2%</td>
<td>23</td>
</tr>
<tr>
<td>Agree</td>
<td>32.7%</td>
<td>17</td>
</tr>
<tr>
<td>Neutral</td>
<td>9.6%</td>
<td>5</td>
</tr>
<tr>
<td>Disagree</td>
<td>7.7%</td>
<td>4</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>5.8%</td>
<td>3</td>
</tr>
</tbody>
</table>

- **answered question**: 52
- **skipped question**: 6

*Source: TX Developmental Education Demonstration Project Survey – Spring 2012*
Logistical Challenges

- Institution’s Systemic Infrastructure
  - Scheduling, registration, enrollment

- Course Evaluation
  - Placement, grading, assigning course credit

- Human Resources
  - Faculty/staff workload
  - Tutors/existing lab assistants (student support)
  - Professional development

- Facilities and Technology
Other Challenges...

- Staffing stand-alone emporium facilities
- Determining ideal class size and workloads
- Getting students comfortable with technology
- Technology “glitches”
Next Steps

- Research and analyze campus “pockets of success”
- Improve emporium experience for students
- Connect emporium with the Texas New Mathways Project
- Expand emporium to other areas
- Use emporium for non-course-based instruction
Thank You!

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