

Developmental Mathematics: Meeting Student Needs

Daryl Stephens
Department of Mathematics and Statistics
East Tennessee State University
President, Tennessee Association for
Developmental Education
stephen@etsu.edu

General Outline

- Background – Developmental Studies in General
- Current Situation at ETSU
- Best Practices
- Redesign

Disclaimer

- I don't have all the answers.
- I don't even have all the questions.
- Your mileage may vary.

"We have always had academically weak, poorly prepared college students. Perhaps we have them in greater numbers today, but then, more students are currently attending college than ever before."

-- Martha Maxwell

Historical Information

BACKGROUND

Pathways through History

- Yale required arithmetic on the entrance exam beginning in 1745 but offered Euclidean geometry as a college level course.
- University of Wisconsin preparatory department 1849-1880
- Morrill Acts of 1862, 1890
- Women's colleges

Pathways through History

- Late 1800s – college enrollment increases 25-32%
- 1.8% of 18-24 year old population enrolled in college in 1890
- Admissions exams become common
- 1915: 350 colleges have preparatory departments

Pathways through History

- Study skills course
- 1930s: <10% of HS graduates attend college
- GI Bill
- Brown vs. Board of Education (1954)
- Junior and community colleges
- 1970s on: growth of research base and professional organizations

Tennessee Board of Regents History

- White Paper results in system-wide mandated program in 1984
- ACT and other scores determined placement into math, writing, reading, and study skills
- Courses classified as remedial or developmental
- *Defining Our Future* (2001)

TBR

- Newest draft A-100 guidelines
 - Cheaper, faster, technologically driven
 - Based on what students need to succeed in college-level class
 - Curriculum units/modules
 - Standalone courses only at community colleges
 - Universities may still provide learning assistance in other ways
 - No separate learning strategies course Fall 2010+

Professional Organizations

- NADE (National Association for Developmental Education) www.nade.net
- CRLA (College Reading and Learning Association) www.crla.net
- AMATYC (American Mathematical Association of Two-Year Colleges) www.amatyc.org

CURRENT SITUATION AT ETSU

Organization

- Original: Centralized division
 - Faculty for math, composition, reading, study skills
 - Extra support for professional development, travel, etc.
 - Director, two secretaries/executive aides
 - Three academic advisors

Organization

- Since 2003
 - Director is also director of university academic advising
 - Advisors are same as for undergraduate advising
 - Faculty reside in math, English, and continuing studies

Admissions and Placement

- ACT subscores < 19: placed in DSP
 - 17-18: placed in intermediate algebra
 - < 17: placed in elementary algebra
 - (much less: placed in prealgebra through agreement with Northeast State Community College)
- No ACT scores 3 years old or less: take COMPASS

Placement cont'd

- Students can challenge their ACT placement by paying to take the COMPASS
- Last-chance test given on first day of semester to bump up one course

Advising

- Freshman orientation
- Early Semester Progress Reports
- Attendance monitoring
- Preparation for next semester

BEST PRACTICES

Organizational Best Practices

- Centralize and coordinate activities, courses, services
- Collaborate
- Part of institutional goals and priorities

Organizational Best Practices

- Support Services
 - Assessment
 - Advising
 - Study strategy workshops/courses
 - Tutoring
 - Individual assistance

Program Best Practices

- Mandatory assessment and placement
- Program evaluation
- Professional development and involvement (include adjunct faculty!)
- Tutoring
- Low reliance on adjuncts

Program Best Practices

- Monitor progress
- Stay true to developmental philosophy
- Integrate labs with class

Instructional Best Practices

- Learning communities
- Variety of instructional methods
 - Distance learning
 - Self-paced instruction
 - Peer review
 - Collaborative and small group learning
 - Computer based instruction
 - Mastery learning
 - Active learning

Instructional Best Practices

“In best-practice institutions developmental instructors consistently utilize a vast array of instructional practices. [They] typically use at least three teaching modes . . . in every class period. . . . This did not mean that developmental instructors needed to abandon the lecture discussion method. . . . They were simply not the sole technique used for teaching.”

-- Hunter Boylan, *What Works*

Accommodating Diversity

- Workshops on alternate teaching and learning methods
- Learning styles inventories
- Transition to individual study
- Fast track courses only with proper screening
- Visual (e.g. PowerPoints)
- Hands-on (e.g. manipulatives)

Instructional Best Practices cont'd

- Supplemental Instruction
- Frequent testing
- Use technology with moderation
- Frequent and timely feedback
- Mastery learning
- Link developmental content to college-level courses

Instructional Best Practices cont'd

- Share with colleagues in a regular, organized fashion.
- Teach critical thinking.
- Teach learning strategies.
- Use active learning.

Instructional Best Practices cont'd

- Classroom assessment techniques
 - One Minute Paper
 - What did you learn today that was most meaningful or useful?
 - What unanswered questions do you still have?
 - Muddiest Point
 - What was the least clear point to you? (Students write on index card and instructors use to plan beginning of next class.)
 - Use only if willing to provide feedback.

WHAT'S NEXT?

Redesign

- Many states, individual institutions
- Rethink what developmental education is for
- Modular or other nontraditional approach
- Political and money considerations
- Cost savings and technology

Redesign Models

- National Center for Academic Transformation (www.thencat.org) models:
 - Supplemental
 - Replacement
 - Emporium
 - Online
 - Buffet
 - Linked Workshop

ETSU Fall 2010 Pilot

- Our own version of the linked workshop: “Stretch Statistics” (details to be worked out this summer)
 - 5 pilot sections of intermediate algebra become the first half of the core math class, probability and statistics with learning support
 - Second half in spring 2011

RESOURCES

Resources

- MyMathLab
- Carnegie Learning
- Hawkes Learning Systems
- Plato
- Locally made videos posted on course management software (Blackboard, WebCT, D2L, Moodle, etc.)
- Look on iTunesU for several online developmental math class lectures.

Recommended Reading

- Boylan, Hunter. (2002). *What Works: Research-Based Best Practices in Developmental Education*. Boone, NC: National Center for Developmental Education.
<http://ncde.appstate.edu>
- Safford-Ramus, Katherine. *Unlatching the Gate: Helping Adult Students Learn Mathematics*.
www.XLibris.com

Recommended Reading

- *Journal of Developmental Education* (NADE)
- *NADE Digest* (NADE)
- *Research and Teaching in Developmental Education* (NYCLSA)
- *AMATYC Journal*
- NADE Monographs (free on www.nade.net)
- *Best Practices in Developmental Mathematics* (free on www.nademathspin.org)

This presentation is available on my faculty web page as both a .ppt and PDF:

<http://faculty.etsu.edu/stephen/>

(Look for a link to the Handouts page, then go to the bottom of the page.)

Daryl Stephens

stephen@etsu.edu (Note: Not “stephens”)