Preparing Students for College Level Math

Heidi Schuler

Indiana Math Tour

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National Institute for Literacy

National Institute for Literacy

The National Institute for Literacy, a federal agency, provides leadership on literacy issues for children, youth, and adults.

LINCS: The **L**iteracy **I**nformation a**N**d **C**ommunication System, is an online information and communications network for adult and family literacy www.nifl.gov/lincs/

Math/Numeracy resources: www.nifl.gov/lincs/resourcecollections/RC_skills.html#math

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Basis of today's presentation are publications on LINCS Math/Numeracy Collection

"Preparing Students for College Level Mathematics" by Pam Meader, Portland Adult Education in conjunction with the National College Transitions Network Promising Practices website, 2006

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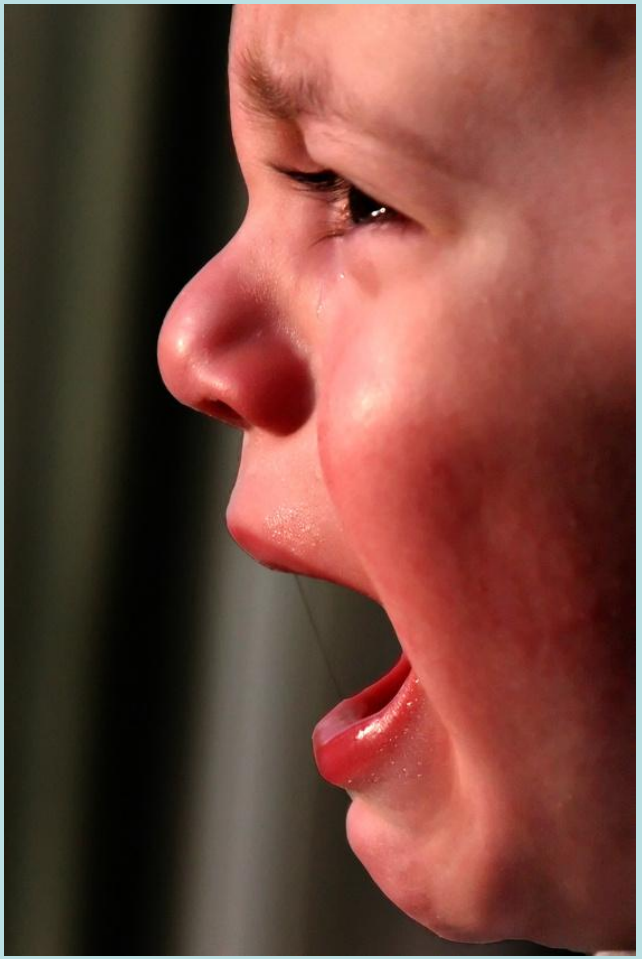
Goals of the workshop

- To introduce participants to the following strategies based on promising practices and current research:
- Peer Interviews
- Goal Setting
- Math Phobia
- Math Journals
- Math labs

Peer Interviews

The best of times… the worst of times



What are the barriers that students face transitioning from the GED and into a college level math class?

Barriers that adults face transitioning from GED to college level math

- College placement tests
- Weak arithmetic skills
- Still weaker algebraic skills
- Math phobia
- Poor math self esteem
- Lacking self advocacy
- Poor reading skills especially in solving word problems

Natalie wants to be a nurse

- Arithmetic score = 21
- Algebra score = 30

- A nursing major requires courses in statistics, anatomy and physiology, organic chemistry, microbiology, pharmacology, pathophysiology

Greg wants to become an environmental scientist

- Arithmetic score =69
- Algebra score = 22

- An environmental science major requires courses in calculus, analytic chemistry, physics, chemistry 1 and 2

Joanne wants to be a psychologist

- Arithmetic = 38
- Algebra = 27

- A psychology major requires courses in statistics, psychological statistics, anatomy and physiology, and experimental methods

Our student's aspirations are not enough

- Nearly half (42%) of students in community colleges are taking remedial courses. Community Colleges are quickly becoming the space where students who need to take catch up courses must go.[i] This includes both recent high school graduates and adults seeking retraining and re-education.

[i] / Alliance for Excellent Education (August, 2006). Paying Double: Inadequate High Schools and Community College Remediation. Washington, D.C.: Alliance for Excellent Education. (http://www.all4ed.org/publications remediation.pdf)

•Moreover, few who begin developmental math continue on to complete a degree. As one professor graphically stated on the front page of the New York Times on September 2, 2006, “It’s the math that’s killing us.”[i]

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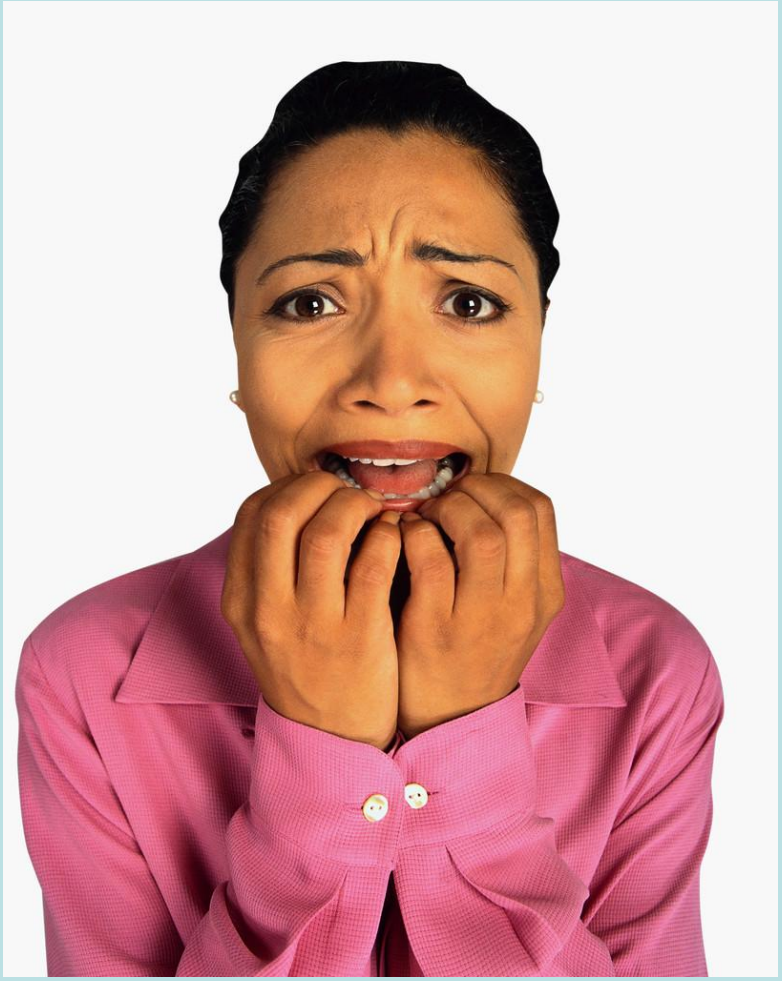
[i] Schemo, D. (2006 September 2). At 2-Year Colleges, Students Eager But Unready. New York Times, pp.1, 9.

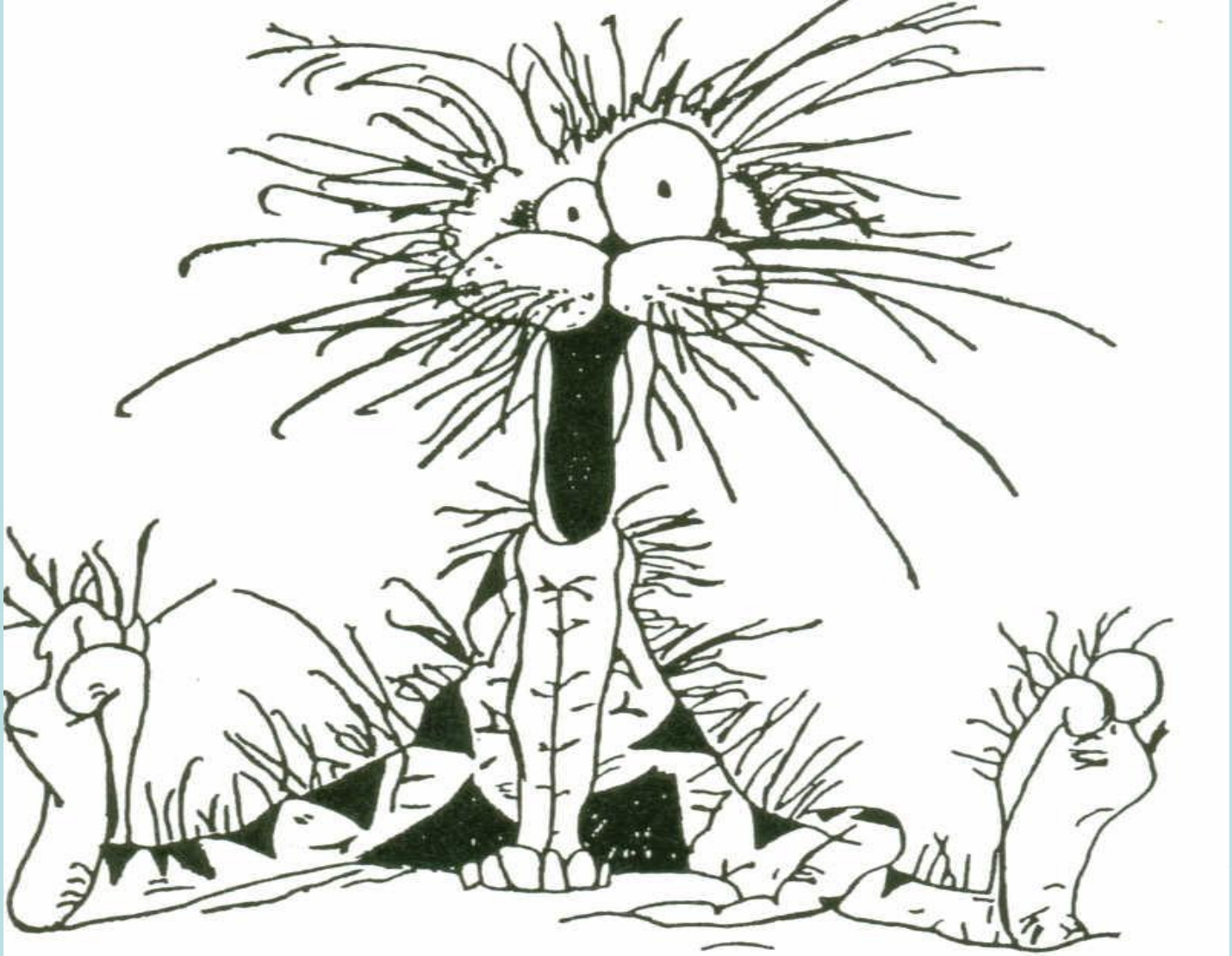
What are the implications?

- Allow practice of basic skills within the context of your class discussions.
- Some students might need extra arithmetic practice in computer lab.
- Make the teaching of algebra (and arithmetic) interactive, applied, and hands-on, ie develop conceptual understanding.
- Introduce technology (scientific calculators, graphing calculators, spreadsheets, etc.)

Where do you begin?



Goal Setting using Force Field Analysis



Math Anxiety!!!!!

Math Alphabet Soup Activity

Productive Disposition

- Includes “the beliefs, attitudes, and emotions that contribute to a person’s ability and willingness to engage, use, and persevere in mathematical thinking and learning.”*
- It is important to address math anxiety and bolster a student’s confidence in their ability to do mathematics

*The Components of Numeracy, p. 30

To address math anxiety and nurture productive disposition

- Develop a safe learning environment where students feel comfortable to explore math concepts
- Support a community of learners doing group activities

Brainstorm :
How can you make your classroom a safe place for learning?

Recommendations from MAA*: “Algebra, Gateway to a Technological Future”

- Investigate models that promote learning for students with different needs, backgrounds, and preparation
- New pedagogical methods such as community building, group work, and inquiry learning can help all students

Understand your students' learning styles and provide lessons that address these styles

NC STATE UNIVERSITY

Index of Learning Styles Questionnaire

Barbara A. Soloman
First-Year College
North Carolina State University
Raleigh, North Carolina 27695

Richard M. Felder
Department of Chemical Engineering
North Carolina State University
Raleigh, NC 27695-7905

Use math journals to develop understanding of algebraic concepts and foster metacognition

Math Journals

- Researchers found that using dialogue journals was an effective venue for active and meaningful learning where the students can express their concerns, ask questions, seek solutions to problems they encounter, clarify their findings and give opinions about what they were learning.

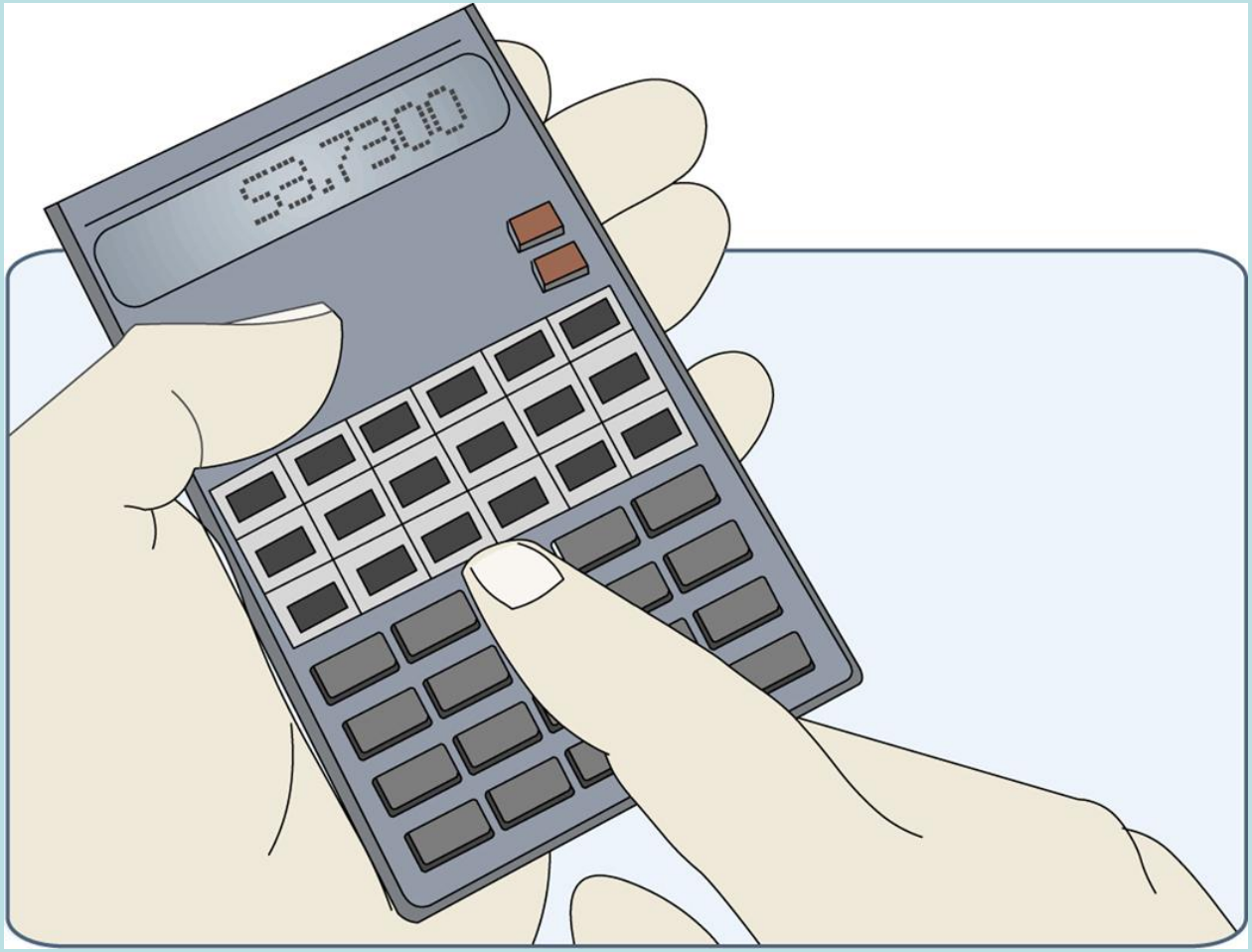
An Affirmation of Math Journals

“ I think the most successful part of this course, for me, are the journals. Numbers and formulas tend to float about rather haphazardly in my mind. The act of *binding* mathematical concepts and numerical processes with words brings me to a far greater level of *understanding* and clarity. Once I have written about something it becomes very easy to visualize and helps me to see *connections between various areas of mathematics*. Writing makes it whole for me, so to speak.”

A 19 year old student from Portland Adult Education, Portland Me.

The Importance of Math Labs to develop conceptual understanding

Exponent lab to develop conceptual understanding



How do we develop conceptual understanding?

Student reactions to labs

- This is the first time that I have ever really *understood* math. Visual and hands on learning made a big difference.
- Fun and got class together. We were comfortable discussing areas we didn't *understand*. It made class fun.
- By performing the labs we were able to *conceptualize* the real world application that algebra has in our everyday life.

Reflections