Part I: First Steps in Preparing for College Level Math: Using Soft Skills

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Objectives of the workshop

- Gain an understanding of why preparation for college-level math is needed by connecting 21st century skills and workplace skills to college readiness skills.
- Gain an understanding of math-specific and general barriers and challenges facing adult learners.
- Gain an understanding of instructional strategies.

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Program for the International Assessment of Adult Competencies (PIAAC)

Watch the PIAAC Overview: https://www.youtube.com/watch?v=p_ICyWAVGLm&feature=youtu.be
What is PIAAC?

- PIAAC is an international large-scale assessment administered in 2011-12 in 24 countries including the United States.
- Organized by the Organization for Economic Cooperation & Development (OECD).
- It assessed 16-65 year-olds, non-institutionalized, residing in each country, irrespective of nationality, citizenship, or language status.
- Administered to a sample of about 5,000 adults on either laptop computer or paper-and-pencil.
- Results from the first round of PIAAC were released in 2013.
- In 2013-14, the United States supplemented its original sample with 3,660 more adults, oversampled:
  - Unemployed (age 16-65)
  - Young adults (age 16-34)
  - Older adults (age 66-74)

PIAAC Results:

- **Engaging with Text**
  - 2/10 adults are unlikely to be able to:
    - Read a paragraph for meaning
    - Compare information from one text to another
    - Understand the purpose and organization of a text
    - Identify and interpret the meaning of words

- **Working with Numbers**
  - 3/10 adults are unlikely to be able to:
    - Understand and use the place value system
    - Perform basic arithmetic operations
    - Understand and use measurements
    - Interpret and solve mathematical problems

- **Problem Solving in Digital Environments**
  - 3/10 adults are likely to have difficulty:
    - Navigate through complex and unfamiliar online tasks
    - Use and understand information presented in digital formats
    - Perform tasks that require the use of computer and internet

U.S. performance in numeracy is particularly poor.

What skills should students have to be successful in college?

"21st Century Skills" Grouped into Three Broad Domains

- **Cognitive**
  - Critical thinking
  - Problem-solving
  - Decision-making
  - Reasoning

- **Interpersonal**
  - Collaboration
  - Communication
  - Teamwork

- **Intrapersonal**
  - Self-awareness
  - Self-motivation
  - Responsibility

Three domains of employability skills

- Effective Relationships
- Applied Knowledge
- Workplace Skills
21st century skills – deeper learning

- Being able to transfer learning to new situations
- Learning goes beyond rote memorization of facts and procedures
- Understanding when, how, and why to apply learning to solve new situations
- Through the process of deeper learning, students develop 21st century competencies


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

Barriers that adults face transitioning from HSE 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

Peer interviews
the best of times... the worst of times

Brainstorm: safe classroom

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

Goal setting using force field analysis
Barriers

Who or what would keep you from completing this math course?

Positive forces

Who or what would help you to complete your goal of completing this class?

Action Steps

The significant active steps I need to take in order to meet my math success goals are:

1. 
2. 
3. 
4. 
5. 
6. 
7. 
8.

The components of numeracy - three components that inform instruction

Context – use and purpose of task

Content – knowledge necessary to complete mathematical tasks

Cognitive and Affective – processes that enable an individual to solve problems


Cognitive and affective component

There are five subcomponents that relate to adult numeracy learning and behavior

1. Make sense of problems and **persevere in solving them**.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Career and College Readiness Standards for Adult Education: Key Shifts and Mathematical Practices pp 44-50

Math anxiety

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

Productive disposition

- It is important to address math anxiety and bolster a student's confidence in their ability to do mathematics

*First I would like to thank you for giving me a chance to practice/improve my math skills. Your understanding and patience made it possible to relate and understand math. Not only improving my math, I've gained other skills as well. Motivation, determination, confidence and much more. All these skills will follow/practice as I enter college and also through out life. Thank you!"**

*Female student from Pam Meader's class, June 2013.

Problem solving

- Teaching for problem solving — teaching skills, then providing problems to practice those skills
- Teaching about problem solving — teaching strategies
- Teaching through problem solving — teaching content through problems

A shift in the role of problems

- Good problems start with ideas that students already have.
- Students learn mathematics as a result of problem solving.
- Students are learning mathematics by doing math!
Why problem solving is important

“In a class discussion or on a problem-solving team, bringing together different viewpoints and experiences makes everyone think harder and provide better evidence for their opinions.”

Katherine Phillips

Teacher testimonial

“I tell my students this over and over again: look at different ways and adapt them to how you think. There are many pathways, and sometimes there are many answers to a single problem. The quest is in the process, not the answer. The process is what reflects how we individually take information in, organize it, and process it.”

Deborah Shriver, ABE/HSE math instructor and ABE Program Manager, Centralia College, Washington state

Reflections

- What resonated with you?
- What activities might you try in your classroom?
- What concerns or questions do you have?
- What are your next steps?

collegetransition.org

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