

The New Gen Ed Math

Presenter:

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Talents Of Teaching:

- Content Expertise and Lifelong Learning

Abstract:

Mathematical beauty is the aesthetic pleasure typically derived from the abstractness, purity, simplicity, depth or orderliness of mathematics. This is great, but our students also need to learn to use technology based tools like spreadsheets and apps that will give them simple answers to questions they will face throughout their lives. This presentation will discuss ways we can enhance our courses so as to provide students with the skills they need to use these tools.

Outcome

- Participants will gain an understanding of the relation of technology to problem solving

Zoom Meeting

- Time: Aug 10, 2020 10:30 AM Central Time (US and Canada)
- <https://cccedu.zoom.us/j/9071883142>

Different ways of looking at Math:

- Math is beautiful but not necessarily useful
- Math is useful in our everyday lives
- Math is used in our other courses
- Math is a requirement for an associate degree
- Math will necessary on the job in the future

How Math has changed over time

- Start by counting things: flocks of sheep
- Record information: **quipu** knots by Incas
- Symbols to represent quantities: Numerals I, V, X
- Techniques for operations: addition, multiplication
- Tools to assist with the process: Abacus, slide rule
- Mechanized tools: Hand Crank Adding Machines

Electronic innovations

- Recording data on Paper Tape and Punched Cards
- Processing data with Relays and Vacuum Tubes
- Semiconductors, Diodes, and Transistors
- Current technology: Integrated Circuits
- The Future: Quantum Computing

What do our students need learn from Math

- How to read and understand a problem
- To identify the given information
- Determine what you need to know
- Find an efficient procedure to get the answer
- And, most important, to check the answer

So far so good, BUT what do we do next.

- We expect them to memorize formulas
- We tell them to plug data into formulas
- We give them tools that are not the tools they will be using when they leave school
- Yes we want them to understand the theory behind the Math they do, but we have to change how they do it.

Technology can replace traditional Math

- A possible example: A disaster investigation board reports that NASA's Mars Climate Orbiter burned up in the Martian atmosphere because engineers failed to convert units from English to metric.
- We can explain the difference between English and metric.
- Then, as an example, we can show different ways to convert 3.5 miles to kilometers
 - using a formula and a calculator $1.609344 \text{ m} = 5.632704$
 - Or ask [Bing](#)
 - Or ask [Google](#)

So what we should be doing

- Encourage them to access Google, YouTube, and other online resources
- Show them how to use tools like spreadsheets and apps
- After they have been exposed to using a tool someone else has created, then you can walk them through the process of creating a tool.

An example - Compound Interest calculation

- First we review simple interest
- Then we explain compound interest and show them my app
- <http://nadas.org/jnadas/js/saveloan.htm>
- Let's compare this with the explanation in the textbook:
- <http://www.opentextbookstore.com/mathinsociety/2.5/Finance.pdf>

To use my app you only need to understand:

- The annual interest rate (APR)
- The number of periods per year
- The number of years or periods
- The starting amount
- Periodic amounts
- The final amount

Examples from the book:

- Example #3
- Example #4
- Example #5
- Example #6
- Example #7
- Example #8