Introducing Spreadsheets across the Curriculum

Len Vacher, University of South Florida

NSF DUE-0126500
(5/15/02 – 4/30/03)

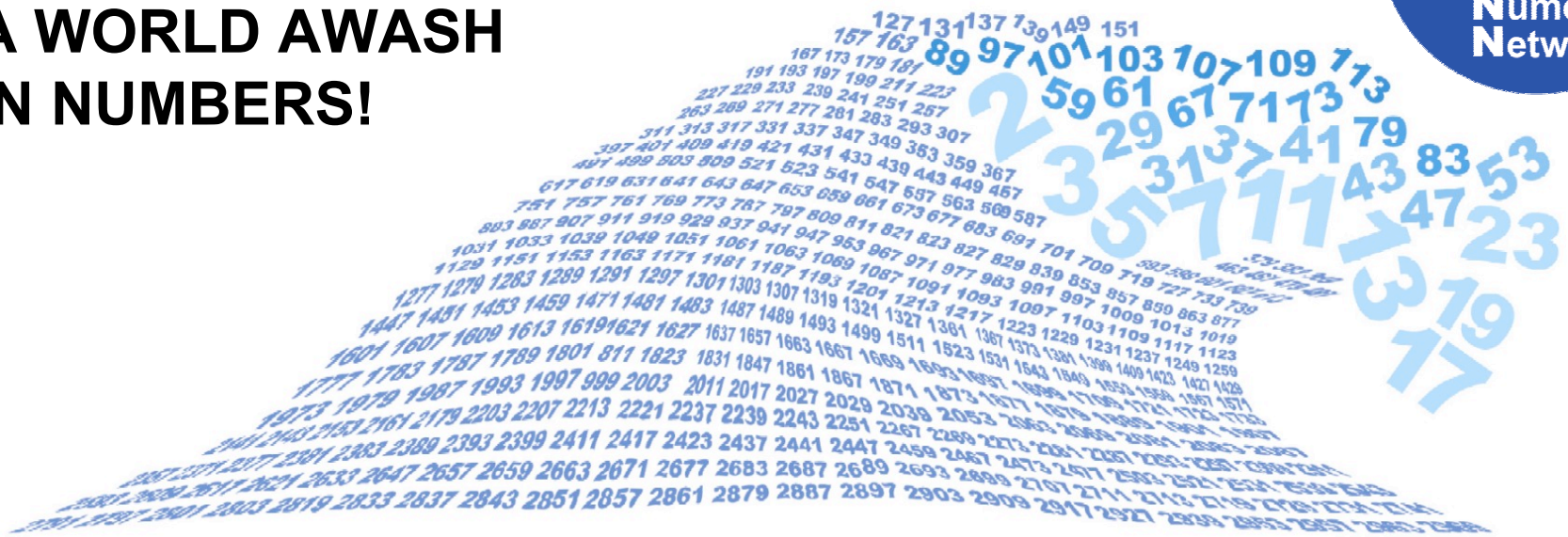
Modules for geological -
Mathematical problem solving.
Proof of concept.

NSF DUE-0442629
(7/05 – 6/08)

Spreadsheets across the Curriculum.
Full Development.

Where I'm coming from.

A WORLD AWASH IN NUMBERS!



QL: A habit of mind in which one engages numbers in everyday context.

QL ⟷

Math phobia
Math anxiety
Math avoidance

Barbara J. Tewskbury, R. Heather Macdonmald, Cathryn A. Manduca, and David W. Mogk, 2004: On the Cutting Edge: Improving Faculty Ability to Design Innovative Courses.

The process begins, not with a list of content items, but with setting goals by answering the question, "**What do I want my students to be able to do on their own when they are done with my class?**", rather than the question, "**What do I want my students to know in this subject?**"

NSF and AAAS, Invention and Impact: Building Excellence in Undergraduate Science, Technology, Engineering and Mathematics, A Conference of the Course, Curriculum and Laboratory Improvement (CCLI) Progam, April 16-18, 2004, Crystal City, Virginia. , p. 39.

What do I want my students to be able to do on their own when they are done with my class?

Solve problems.

Polya.

Our knowledge about any subject consists of *information* and of *know-how*. If you have genuine *bona fide* experience of mathematical work on any level, elementary or advanced, there will be no doubt in your mind that, in mather **than mere possession c** What is know-how ir **not merely routine of independence, j** A problem is a 'grea problem if it is just a little difficult. Yet some degree of difficulty belongs to the very notion of a problem: **where there is no difficulty, there is no problem**. (p. 117)

Polya's heuristic –

1. **Understanding the problem.**
2. **Designing a plan.**
3. **Carrying out the plan.**
4. **Looking back.**

Mathematical Discovery: On Understanding Learning, and Teaching Problem Solving (Wiley, v. 1, 1962, 216 pp; v. 2, 1965, 191 pp.

My Course: Computational Geology

Purpose: To solve (geologic) problems (not exercises) with quantitative content.

- 15-25 students.
- Late Juniors, early Seniors.
- Capstone for required math for the major (one year of calculus).
- Non lecture
  - Each class: A “How to Solve It” session
  - “Just in time teaching”
  - Target: Leave with plan to build a spreadsheet to solve problem
  - Homework: work through module on course Website
  - Hand in selected “End-of-module questions”
- Term project: Groups make and present a SS module.

Rules/Tips for Modules

Teach the math, not the context.*

Remember, 13-16 slides. Target for 15.

Include one or more slides that preview the module.

Pose the problem.

Build the spreadsheet in successive slides.

End with “end-of-module questions.”

Create metadata for cataloging and access.

Rules/Tips for Modules

Expect that whatever you think will be in one module will take 3-4 modules.

Do not expect that your students will have mastered unit conversions.

Repetition is a good thing.

Tip from his students → Small Steps, All Steps.

(Reinforce the problem solving process!)