Using Current Technology to Support and Improve Mathematics Instruction

(Double Session)
Presenters

• Vince Daniele: Introductions
• Karen Bochette and Marie Bernard Case: Interpreting
• Joan Carr: Opening Comments
• Sharron Webster: MathXL & Math Gallery
• Patti Wink: TI-SmartView
• Miriam Santana: TI-Nspire
How Do These Technologies Enhance Instruction for Deaf Students?

- Concepts can be explored and demonstrated visually
- Visuals become the basis for conversations about mathematics
- Multiple examples are easy to generate
- Class discussions and notes can be captured
How Do These Technologies Enhance Instruction for Deaf Students?

- Students can participate in explorations
- Standard mathematical symbols are used
- Students expect technology to be a part of the learning experience
- Instructors become re-energized using new technologies
MathXL

www.mathxl.com
What is MathXL?

MathXL is a powerful online homework, tutorial, and assessment system that accompanies textbooks in Mathematics and Statistics.
What is MathXL good for?

• Distance Learning

• Large number of students

• Blended Learning
Basic Requirements

• **Internet connection**
  – Cable/DSL, T1, or other high-speed for multimedia content
  – 56k modem (minimum) for tutorials, homework, and testing.

• **Memory**
  – 64 MB RAM minimum

• **Monitor resolution**
  – 800 x 600 or higher (students), 1024 x 768 (instructors)
Basic Requirements (cont.)

• **Plug-ins**
  
  – MathXL Player
    • Requires Microsoft Windows and Internet Explorer 6.0.
  
  – **NEW:** MathXL Player, version 2
    • Starts in Fall 2008
    • Is compatible with MAC computers and all standard browsers
Basic Requirements (cont.)

• QuickTime Player

• Macromedia Flash Player

• Adobe Reader
Features for Instructors

- Powerful homework and test manager
- Custom exercise builder
- Comprehensive gradebook tracking
- Complete online course content and customization tools
- Copy or share courses and manage course groups
Features for Students

• Study plan for self-paced learning
• Interactive tutorial exercises
• Multimedia Learning Aids
Example: Picograph

“Help Me Solve This”

At-Bat Record

<table>
<thead>
<tr>
<th>Home Runs</th>
<th>![Home Runs Symbols]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triangles</td>
<td>![Triangles Symbols]</td>
</tr>
<tr>
<td>Doubles</td>
<td>![Doubles Symbols]</td>
</tr>
<tr>
<td>Singles</td>
<td>![Singles Symbols]</td>
</tr>
<tr>
<td>Walks</td>
<td>![Walks Symbols]</td>
</tr>
<tr>
<td>Outs</td>
<td>![Outs Symbols]</td>
</tr>
</tbody>
</table>

= 2 times at bat

Use the pictograph to the left.

How many of the player's at-bats were walks?

The actual amounts are not listed. The key tells what each symbol equals.

According to the key, each symbol represents 2 times at bat.

To calculate the number of walks, multiply the number of symbols in the row headed 'Walks' times 2.

The number of walks is 5.

The exercise is complete.
Example: Word Problem

An airplane is carrying 342 passengers. When it lands in Atlanta, 221 passengers get off the plane. How many passengers are left on the plane?

There are □ passengers left on the plane.

Enter any number or expression in the blue-outlined box, then click Check Answer.

This question is worth □ points.
Example: Graph

Graph using the slope and the y-intercept.

\[ y = -\frac{1}{2}x + 2 \]

Use the graphing tool to graph the line. Use the slope and y-intercept when drawing the line.

To pop up your graph, click the Click to enlarge graph button.
Student: Pros

- Available 24/7
- “Help Me Solve This” or “View Example”
- Immediate Feedback: 3 tries to get the answer right
- Opportunity to re-do incorrect problems (before due date)
- Quick Turn-Around Time for Grade
- Due Date Schedule
- Personalized study plan
Student: Cons

- Limit to PC platform (until Fall 2008)
- Language can be challenging for some students.
- Use MathXL as a game (not self-learning)
- Most video & animation are not captioned
- Captioned video is not easily accessible for Deaf/HH students.
Math Gallery
Notebook Software within SmartBoard

www.smarttech.com
What is Math Gallery?

• Backgrounds, clip art, pictures and multimedia content related to math stored in gallery (folder)

• Primarily use for instructor
Examples

• Ruler (image & flash)

• Trigonometric Transformation Program

• Best-Fit Line

• Dice
Pros

• User friendly
• Easy to copy & paste to other document
• Rotate/flip image
• Group lock multi-images as one image
• Search tool to find math image
• Free Notebook software to download
• Excellent Help feature (connect directly to the website)
• Prepared from your desktop
Cons

- Need to learn Notebook software
- Require Smart Board product
- Pointer needs alignment occasionally
TI-SmartView Emulator Software

An Effective Demonstration Tool for Instructors
Benefits for Instructors

- An expanded calculator screen to show details in large or crowded classrooms

- An interactive representation of the calculator’s display to the entire class
Benefits for Students

- Increase understanding of concepts and relationships
- Develop calculator skills
Pros

- Easily integrates with existing projection systems and interactive whiteboards
- Large vision of calculator keypad
- Three ways to maneuver a calculator on the Smartview:
  - computer (keyboard or mouse)
  - calculator as a remote keypad
  - interactive whiteboard (touching the buttons on the screen itself)
Pros (continued)

- Multiple representations simultaneously
  - Graph
  - Table
  - Equations
  - List window
  - STAT plot screens
Pros (continued)

- Key press history to the entire class
- Preloaded demonstrations (scripts) increase students’ understanding the use of the calculator.
- Easily captures a screen display for documentation using the drag-and-drop or copy-and-paste feature.
Cons

- Slow response time
- Need to orient SmartBoard for accurate key pressing
- Calculator display not shown when use as a remote keypad
- Need TI-Connect software to download applications to TI-84 calculator
- Require OS 2.4 operating system on TI-84 calculator
- Different SmartView layouts for Mac and PC
Get Inspired in your classroom

Working with
TI-Nspire
By
Miriam Santana
Two Calculators in one

• TI-Nspire is not a regular calculator → Handheld

• Two key pads, and one handheld device

• Make a comfortable transition from the TI-84 to the TI-Nspire
The TI-Nspire Family
Tools for your classroom

1. TI-Nspire handheld
2. TI-Nspire software
TI-Nspire Applications/Tools

1. Calculator

2. Graphs & Geometry

3. Spread-Sheet

4. Notes

What is the area of $\triangle ABC$?

5. Statistics
Applications Overview

CALCULATOR

TI-Nspire:
• Enter and view expressions, equations and formulas exactly as they appear in math textbooks
TI-Nspire:

- Graph Trigonometric functions, Parametric functions, Polar functions and Scatter Plots.

- You can have them all in the same screen.

- Construct and explore geometric figures interactively and create animations.
Applications Overview

GRAPHS & GEOMETRY

TI-84

Window:
- Xmin = -10
- Xmax = 10
- Xscl = 1
- Ymin = -10
- Ymax = 10
- Yscl = 1
- Xres = 1

TI-Nspire
Lists has been replaced by spreadsheet features similar to computer software.

You can have these three representations on one page.
Applications Overview

NOTES

• Put the math in writing.

• Use 3 formats:
  1. Default (Word Processor)
  2. Q & A (Question and Answer)
  3. Proof
Applications Overview
LISTS & SPREADSHEET

• Experience capabilities similar to using computer spreadsheets:
  1. Label columns
  2. Insert formulas into cells
  3. Select individual cells, and change their size.
IMPORTANT FEATURES

• Multiple Representations
• Linking Representations
• Grab-and-Move Feature
• Interactive Geometry
• Save & Review Work
IMPORTANT FEATURES

• View individual representations or as many as four on a single screen

• See and explore multiple representations of a problem: written, graphic, numeric, and algebraic forms
IMPORTANT FEATURES

- The multiple representations of a problem can be dynamically linked.

- The dynamic linking of representations provides real-time, interactive feedback: students are able to compare their predictions to actual outcomes.
IMPORTANT FEATURES

• “Grab-and-Move”
  1. Background
  2. Tick marks (scale)
  3. Functions
  4. Labels

• Manipulate the appearance of a graph function. The corresponding equations of each function will update automatically.
IMPORTANT FEATURES

• Interactive geometry capabilities.
  1. Measure angles and sides of polygons.
  2. Calculate surface area and slopes

• Students can discover and make conjectures about relationships and properties of geometric figures.

• Sketch and animate diagrams
IMPORTANT FEATURES
Save & Review Work

• Create, save, edit and view documents.

• Similar to the file storage features of a personal computer.
Define $g(m,n) = \text{Func}$
If $m \geq 0$ Then
Return $n$
Else
Return $2 \times n$
EndIf
EndFunc
Closing Remarks
Contact Us

- Vince Daniele: vadntm@rit.edu
- Joan Carr: jacntm@rit.edu
- Sharron Webster: smwsdo@rit.edu
- Patricia Wink: pswntm@rit.edu
- Miriam Santana: mesntm@rit.edu