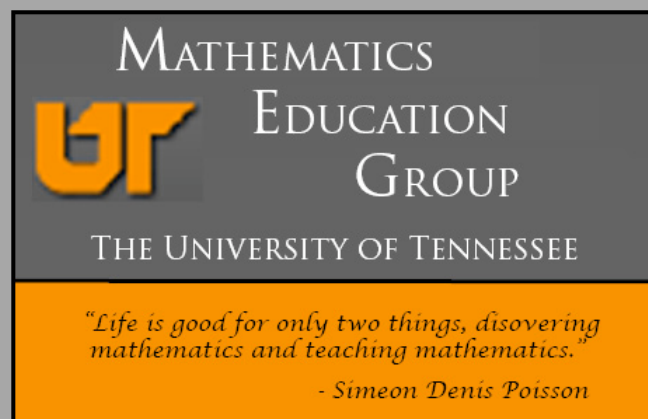


Using Online Courses to Link Research to Practice in Mathematics Classrooms

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Teacher Preparation

- ❖ Middle School licensure
 - K-8
 - 7-12
- ❖ Neither licensure adequately addresses National Middle School Association Standards

Goals of Online Classes

1. To encourage beliefs that support inquiry-based practices
2. To provide opportunities to enhance both content and pedagogical content knowledge
3. Focus the teachers' decision-making processes on evidence of student learning
4. To provide easy access to professional development

Course Development Rationale

- ❖ Identify teachers' beliefs
 - Beliefs influence instructional decisions
 - Beliefs influence learning from a cognitive perspective

- ❖ Building teachers' content knowledge by focusing on the development of students' content knowledge
 - Pedagogy \rightarrow PCK \leftarrow Content Knowledge
 - Pedagogy \leftarrow PCK \rightarrow Content Knowledge

Course Development Rationale

- ❖ Teachers as learners of mathematics

(Ball, 1996; Loucks-Horsley, Hewson, Love, & Stiles, 1998; Ma, L., 1999)

- ❖ Using standards-based middle school curricula in professional development

(Ball & Cohen, 1996; Beckmann, et.al., 2004; Reys, Reys, Beem, & Papick, 1999)

Course Development Rationale

- ❖ Using cases of mathematics instruction (Merseeth, 1996; Stein, Smith, Henningson, & Silver, 2000)
- ❖ Collaborative examination of student work in order to increase teachers' flexibility in mathematical thinking (Franke & Kazemi, 2001; Wilcox & Jones, 2004)

Course Design

❖ Synchronous, asynchronous, & face-to-face

- Centra software
- Blackboard software

Course Design

❖ 4 Courses

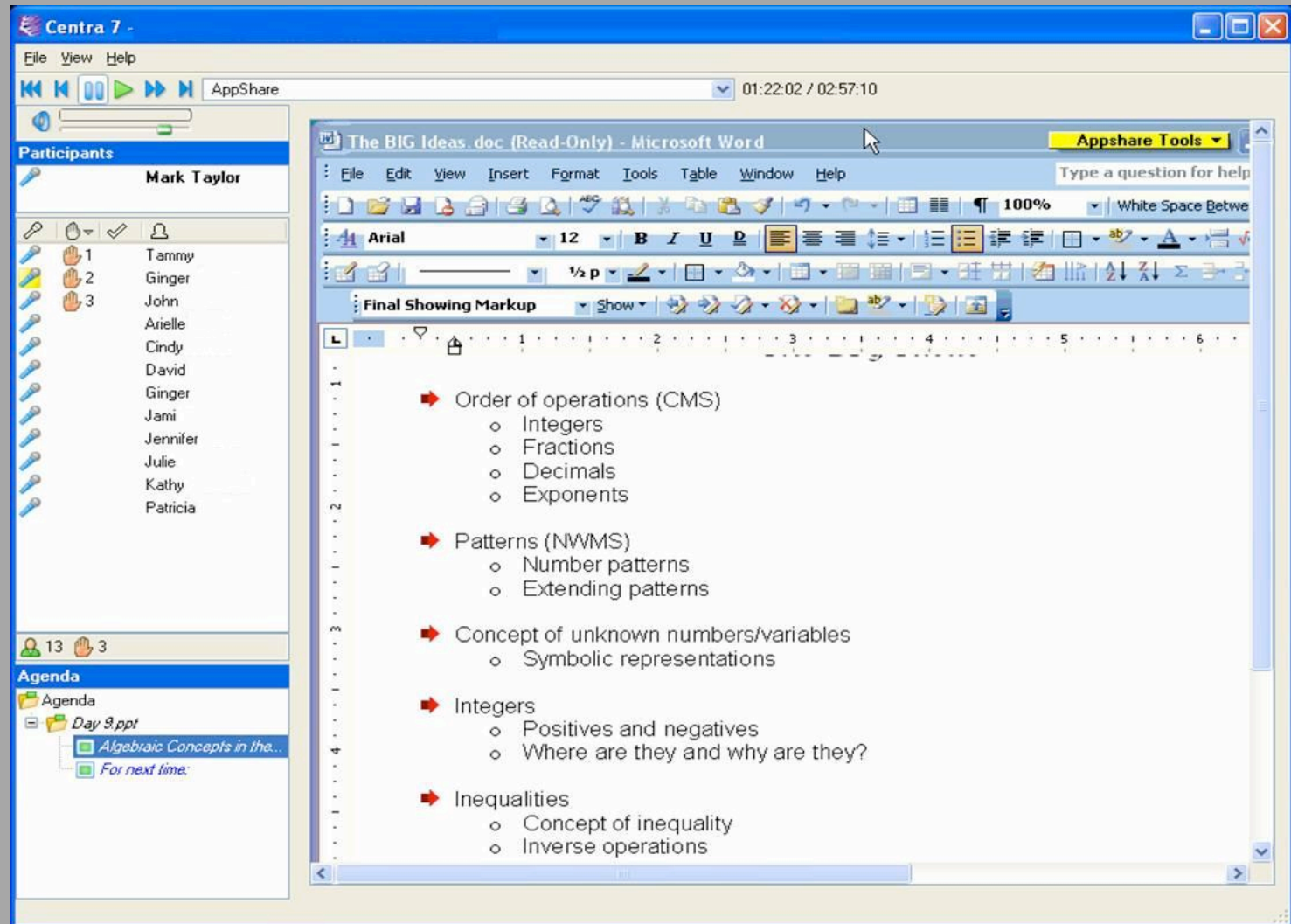
- rational number
- algebra
- geometry
- data analysis and probability



❖ Cohort groups

- 3-5 members @ local schools
- Each Tuesday 4-7 pm

Centra Software



Centra Software & Notetaker

The screenshot displays the Centra software interface during a meeting. The window title is "Centra". The menu bar includes "File", "View", and "Help". Below the menu is a toolbar with icons for chat, mute, and other functions. A status bar at the top right shows "AppShare" and a timer "1:52:44 / 2:22:47".

On the left side, there are two lists:

- Presenters:** JaAnn, John, Ginger.
- Participants:** David, Jennifer, Tracy, Patricia, Jami, Kathy, Cindy, Ginger, Arielle, Ginger, Julie.

Below the participant list, there are icons for "Agenda" and "Documents".

The main area of the window shows a shared notepad with handwritten notes. The notes are organized into a grid of boxes, each labeled "bag 1" through "bag 9". Each box contains a diagram of a tree structure with numbers and names. For example, "bag 1" has a tree with root "1/4" and children "Q", "2", "3", "4". "bag 2" has a tree with root "1/3" and children "5", "6", "7", "8". "bag 3" has a tree with root "1/3" and children "9", "10", "11", "12". "bag 4" has a tree with root "1/3" and children "13", "14", "15", "16". "bag 5" has a tree with root "1/3" and children "17", "18", "19", "20". "bag 6" has a tree with root "1/3" and children "21", "22", "23", "24". "bag 7" has a tree with root "1/3" and children "25", "26", "27", "28". "bag 8" has a tree with root "1/3" and children "29", "30", "31", "32". "bag 9" has a tree with root "1/3" and children "33", "34", "35", "36".

On the right side of the notepad, there is a list of items:

- 03 - UAB
- 17 - FLORIDA
- 24 - LSU
- 01 - OLE MISS
- 08 - GEORGIA
- 22 - ALABAMA
- 29 - S. CAROLINA
- 05 - NOTRE DAME
- 12 - MEMPHIS

Data Sources

- ❖ Class assignments
- ❖ Online class recordings
- ❖ Discussion Board postings

Data Analysis

- ❖ Constant comparative
- ❖ Generating themes
- ❖ Grounded Theory

Results

❖ Emerging Themes

- Language - mathematical terms
- Use of multiple representations
- Use of activities that encourage social construction of ideas
- Autonomous learners
- Integration with other concepts & disciplines

Results

- ❖ Language - mathematical terms
 - Inverses, reciprocals, and opposites
 - Capacity vs. volume
 - Variables vs. Symbols

Results

- ❖ Use of multiple representations
 - Division of fractions
 - Probability problems selected

Results

- ❖ Use of activities that encourage social construction of ideas
 - Geometric definitions
 - Pythagorean theorem
 - Algebra sorting activities

Results

❖ Autonomous Learners

- Big Ideas
- Respectfully challenging peers
- Shift in roles of instructor and students

Results

- ❖ Integration with other concepts & disciplines
 - Algebra and geometry
 - Measurement and science
 - Data and science

Challenges

❖ Technology

- Learning curve
- Speed & Down time
- Shift in thinking from deficit model to an abundance model

Challenges

- ❖ Students could “hide”
- ❖ Modeling inquiry practices
 - Making instructional decisions based on student work
 - Using manipulatives

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