Interactive Approach in Math Activities to Gain Better Understanding in Ratio, Percentage, Fractions, and Problem Solving

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Goals

- Be able to have a math conversation with students, during activities outside of the class, and assisting students in connecting mathematics to the real world.

- Be able to work in a group to create ideas for tactile learning to be included in future lesson plans.

Agenda

- Background (Research Lit)
  - My motivation?
- Learning Styles
- Informal Discussion
  - Group Activity
- Tactile Learning
  - A few examples..
  - Group Activity
- Things to think about.
- Recommendations

Research Lit

- Lag In Deaf Students' Achievement In Mathematics
  - Basic Concepts (e.g., Kritzer, 2009)
  - Mathematics Computations (e.g., Traxler, 2000)
  - Problem Solving (e.g., Qi & Mitchell, 2007)
  - Curriculum/Teaching (e.g., Mousley & Kelly 1998)
  - Mathematical Word Problem Solving (e.g., Kelly, 2008, Kelly & Mousley, 2001; Kelly & Gaustad, 2007)
- Applying procedures without understanding the underlying concepts (Gabriel, 2016)
- Conceptual and procedural knowledge are essential to understanding both whole numbers and fractions (Hiebert & Lefevre, 1986, several more references)

Research Lit

- Incidential Learning (Many references)
- Thinking out loud during problem solving. (Mousley and Kelly, 1998)
- 2008-2012 Research Findings (Moose's)
  - Important of interactive with Parents and others
    1) Students who are good in reading (English) have a good understanding of fractions. (Mousley & Kurz, 2015, Mousley & Kelly, in process)
    2) Students who have strong interactions in their home tend to have a good understanding of fractions. (Kurz & Mousley, 2015) [although n is small.]

Reminder:
Deaf people's learning styles.

- Deaf people are like hearing people when it comes to learning styles
  - Some are visual learners
  - Some are auditory learners
  - Some are tactile learners
  - Some use more than one learning style

Informal Discussion with your students

- VIDEO (2 parts)
- What do you think?
- What do you suggest?

Informal discussions (Role Play)

- Someone will be a teacher and other will be a student.

- Pick one topic for you to do role play
  - Miles Per Hour (MPH)
  - Resolution
  - Field Trip (Problem Solving)
  - Slope 7% grade (sign on the highway)
  - Service Tip (15%)

- When you are ready, feel free to come up here and demo!

Parent Survey Findings: Examples They Use With Their Children

- Mathematics on the road:
- How many miles or hours are left to arrive at destinations? We compute how many minutes to arrive at a specific distance.
- Mathematics while shopping or eating out (tip, tax)
- Figure out how much change will be received
- Fractions at home:
- We measure cutting woods with fraction measurements.
- We use measure cups for cooking.

Ideas of using different strategies

- Use different representations (concrete concepts → abstract concepts)
  - Comparison (ratios)
  - Diagrams/Illustrations
  - Deeper understanding what fraction is
- Encourage students to develop relationships between fractions and personal experiences (e.g., mpg, size, ratios, discount/sale, sets)

Nothing can replace a good healthy discussion instead of paper. Do more hand-on experiences.

GUIDING STUDENTS TO SOLVE PROBLEMS LIKE EXPERTS

Tactile learning

- Characteristics of Tactile Learners
  - Learn best by doing manipulate and physically touch objects
  - Doers and creators, prefer to watch demonstrations.
  - Some would playing around with objects, ”hands-on”
- Visual approaches may not work.
- Watching teachers explaining through the air may not work.

- https://educationalmethodseps.weebly.com/tactile.html

Tactile learning

- INVOLVE ME! (Famous quote!)
- Manipulatives (younger kids)
- Role Play
- Models →
- Group or Individual learning

Group Activity
Square and Cube Numbers Jigsaw

- Group of two or three.
- Ten minutes activity
  - While you are doing this, think how would you use this in your class.

Group Activity
Number Line

- Making a number line.
- No signing or talking.
- No paper.

- How would you teach the concept of number line?

- For example: where is 3, ½, ¼, -2, 2¼?

THERE IS MORE CONFUSION!

- THIS IS A GOOD OPPORTUNITY TO CLEARLY COMMUNICATE YOUR IDEAS ACROSS.

- 1/4 apples are gone.
- ¼ of an apple is eaten.

- How would you explain to your students?
    - Remember learning styles

Theorem Tactile??

- SUM of 3 angles in ANY triangle is 180 degrees.

- What would you do?

Tactile and Technology

- There are many games on internet.
  - Some good and some bad.
- You as a teacher observe their activities on the game.
- ASK yourself, are they learning?

  - Maybe pre and post test?
  - Ask them to explain the game to you.
  - others?

Recommendations

- Thinking out loud during problem solving. (Mousley and Kelly, 1998)
- Dialogue, Dialogue, Dialogue
- Repeat Exposure to real life experience
- Keep on working on any math topics with a **positive** attitude.
- Limit usage of calculator until skill mastered.
- Personalize math problems.
  - Use your students‘ names
  - Involve them
  - Role-play
- Ask your colleagues for more ideas.

Questions?

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- Copy of this PPT? provide me with your email.