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

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November 2019
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
• 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

• Incidental 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

In 1920, there was an average of 5 people per vehicle on the road.

In 1950, there were 3 people per vehicle.

And by 1970, there were only 2 people per vehicle.

According to this progression, how many people would there be per vehicle in 1990?

One person in every third vehicle.
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, \( \frac{1}{2} \), \( \frac{1}{4} \), -2, 2\( \frac{1}{4} \)?
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
• 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?
• Contact info:
  • Keith Mousley “Moose”
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  • Copy of this PPT? provide me with your email.