Preservice Point of View: Order of Order of Operations

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This section of the *LATM Journal* is designed to link teachers and future teachers. In each journal, responses to a mathematical task by preservice teachers are presented. It is anticipated that these responses will provide insight into understanding, reveal possible misconceptions, and suggest implications for improved instruction. In addition, it is expected that this section will initiate a dialogue on concept development that will better prepare future teachers and reinforce the practices of current teachers.

Preservice elementary education students who had previously completed a problem solving and number sense course were given a word problem to analyze their understanding of order of operations. When students are taught order of operations, they are given a list of steps such as the following:

- Simplify inside groupings of parentheses, brackets, and braces first. Work with the innermost pair, moving outward.
- Simplify the exponents.
- Do the multiplication and division in order from left to right.
- Do the addition and subtraction in order from left to right.

Then, students are typically given an acronym to remember those steps. Some of the common acronyms are:

- **P**lease **E**xcuse **M**y **D**ear **A**unt **S**ally (*Parenthesis, Exponents, Multiply, Divide, Add, Subtract*)
- **BEDMAS** (*Brackets, Exponents, Divide, Multiply, Add, Subtract*)
- **B**ig **E**lephants **D**estroy **M**ice **A**nd **S**nails (*Brackets, Exponents, Divide, Multiply, Add, Subtract*)
- **P**ink **E**lephants **D**estroy **M**ice **A**nd **S**nails (*Parenthesis, Exponents, Multiply, Divide, Add, Subtract*)

Once students are taught the rules, they are given problems to practice that may resemble this

problem:

$$\frac{[13 - (2)(6)] + 4}{(12 \div 4)(2)}$$

While it is recognized that students must practice with numerical examples of this type, it

is possible that these specific calculations may not actually demonstrate understanding of the

order of operations as they relate to situational problems. In situational problems involving

multiple operations as the problem above, it has been observed that many students will solve the

problem in a segmented, individual step-by-step approach.

In an effort to determine whether understanding that the step-by-step approach is indeed

utilizing the order of operations, the students were given a problem asking them to "write a

single numerical expression that shows all necessary arithmetic operations to solve the problem."

The problem read as follows:

Ice Cream in a Classroom

- **Consider the following scenario:**
There are two classes at I.T.S. Fun Elementary School. They are referred to as Class A and
Class B. Each class has twenty-eight students. Last Friday six students total were absent
from both classes. The teacher for Class A bought 2 gallons of ice cream at $4 each and
the teacher for Class B bought 3 gallons of ice cream at $5 each. The ice cream was to be
shared equally among all students present on last Friday. (The teachers were not going to
eat any ice cream.) What was the cost per student?
- **Your task is as follows:**
Write a single numerical expression that shows all necessary arithmetic operations to solve
the problem. Please explain the expression in words as it relates to the problem.

Follow the link and enjoy the mathematical thinking of some of Louisiana's preservice teachers!

Click here for responses.

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