Generalizing and Justifying: Pre-Service K-8 Teachers’ Strategies and Representations

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Introduction

- Inductive Reasoning (i.e. reasoning from specific cases to the general) is an important way of mathematical thinking.
- Multiple ways of thinking about mathematical concepts provide evidence of deeper understanding

Objectives

- To identify and describe pre-service K-8 teachers’ processes of generalizing and justifying:
  - Strategies
  - Representations
  - Use of visual/structural and numerical information

Methodology

- 17 Pre-Service Teachers
- 184 written solutions to pattern finding
- Qualitative analysis of solutions using specific rubric

Data Analysis

Evidence of Understanding

Algebraic

Arithmetic

Systematic/Not Systematic

Representation (table, graph, diagram or list)

Single

Multiple

Organization

Trial & Error

Results and Discussion

- Generalization
  - Structural
  - Numerical
  - None

Justifications

Valid

Invalid

None

Sample: Type of Work Reviewed

- Use of algebra and arithmetic to solve
- Simplified into explicit formula
- Linked numbers to structure
- Extended to ALL cases

Evidence of Organization

2 or more ways

1 only

None

Evidence of Understanding

Generalizations made with numbers only were the most frequently observed

- Algebra & Arithmetic together were the most frequently observed
- The use of one method of organization was most frequently observed

- Invalid justifications were most frequently observed

Bibliography


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