

PRESERVICE MATHEMATICS TEACHERS' PERSPECTIVES OF MATHEMATICS DURING



A MATHEMATICAL LETTER WRITING EXCHANGE

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Introduction

This poster shares insight to preservice mathematics teachers' (PSMTs) perceptions concerning a *good* mathematical task and the value they attributed to their participation in a mathematical letter writing exchange (MLWE) with a class of rural geometry students (Wilson & Anthony, 2022).

Significance

This research hopes to add to the literature on MLWEs by investigating the value PSMTs reported while participating in this MLWE program. Above and beyond this, the majority of MLWE programs have been conducted with elementary and middle schools paired with PSMTs. In contrast, this study investigated data collected from a MLWE between high school students and two middle school PSMTs and one secondary PSMT enrolled in a mathematics methods course.

Research Questions

1. What were the PSMTs' perceptions of value after participating in a MLWE with a rural class of high school geometry students?
2. How did PSMTs' thinking change towards the qualities of a *good* mathematical task as they participated in a MLWE?

Methodological Framework

This study employed interpretivism for the methodological framework. This lens focuses on making meaning of events that take place and how the participants make sense of these schemes (Maxwell, 2013). Furthermore, keeping with prior MLWE research, this case study collected multiple forms of data from a bounded system of middle and high school PSMTs enrolled in the mathematics methods course at a southern university in the fall of 2019.

Theoretical Framework

The MLWE "provided a context that resembled the interactive nature of teaching practices but without the immediacy and pressures for action that characterize actual mathematics classrooms" (Crespo, 2000, pp. 157–158). Teachers can construct their knowledge about teaching as they engage in the MLWE without "any hint of a critical spirit" (Crotty, 2003, p. 58). Therefore, this study used a constructivist stance to further inform this research.

Methods

Participants' letters and mathematical tasks, individual and focus group interviews, and PSMTs reflective papers composed the data for this study. I used inductive analysis to review the interview transcriptions, and did content analysis to investigate the letters, mathematical tasks, and reflective papers. I kept a reflexive journal throughout this research process. I also, member checked, peer reviewed, and triangulated the data.

Discussion

Table 1. MLWE Logistics

Item	Student → Preservice Teacher		Student ← Preservice Teacher	
	Letter	Date	Letter	Date
Letters	Letter 1	8/27/2019	Letter 2	9/3/2019
	Letter 3	9/10/2019	Letter 4	9/17/2019
	Letter 5	9/24/2019	Letter 6	10/01/2019
	Letter 7	10/08/2019	Letter 8	10/22/2019 ^a
	Letter 9	10/29/2019	Letter 10	11/05/2019
	Letter 11	11/12/2019	Letter 12	11/22/2019 ^b
Tasks	Completed Tasks (CT)		Feedback on Task (FB)	
	CT1	9/10/2019	FB1	9/17/2019
	CT2	9/24/2019	FB2	10/01/019
	CT3	10/08/2019	FB3	10/22/2019 ^a
	CT 4	10/29/2019	FB4	11/05/2019
	CT 5	11/12/2019	FB5	11/22/2019 ^b

^a The researcher was supposed to give the letters and mathematical tasks to the high school students on 10/15/2019. However, she had to wait a week due to fall break.
^b The researcher was supposed to deliver the final letters and mathematical tasks to the high school students on 11/19/2019. However, snow days created a delay.

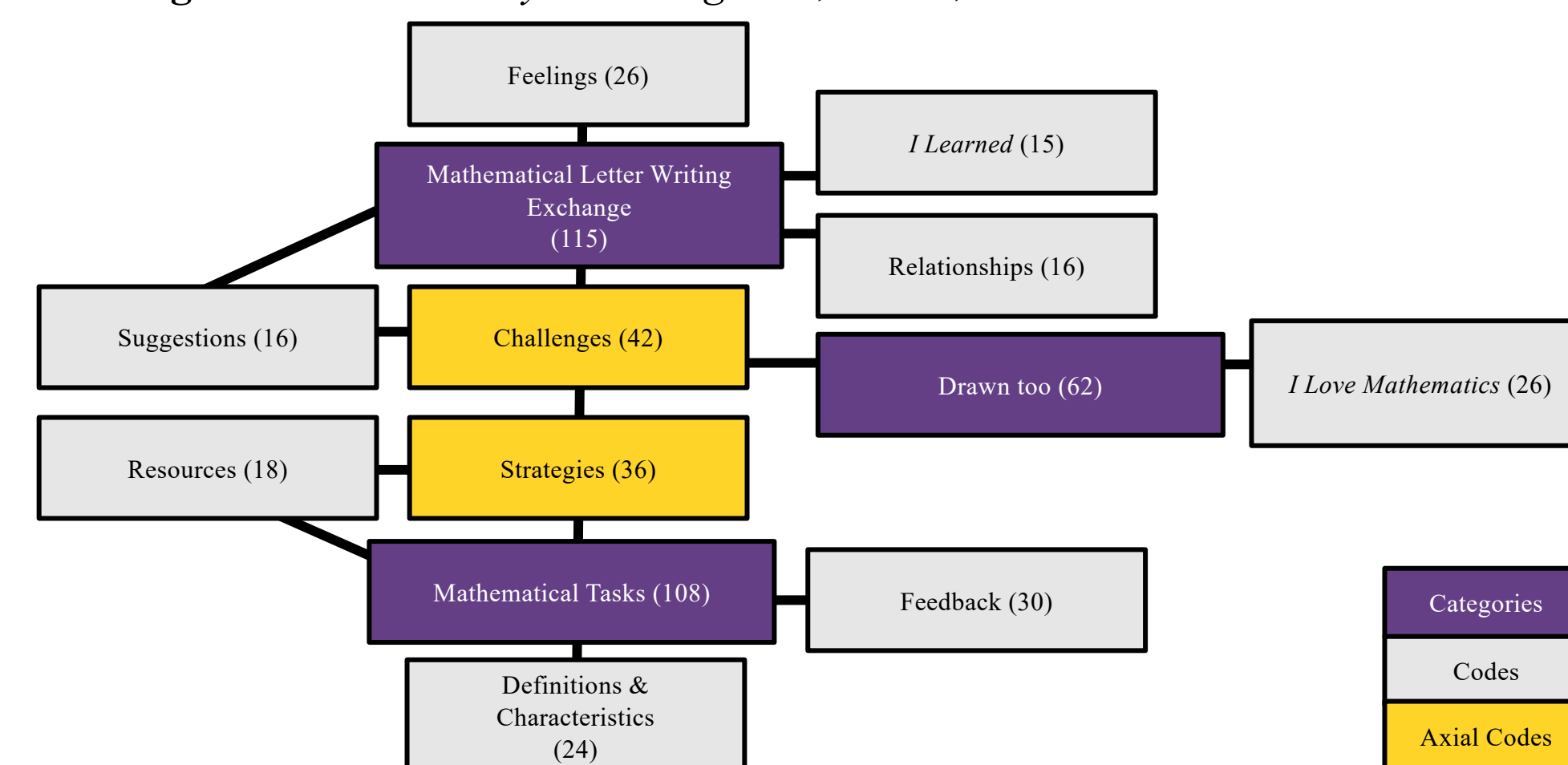
Table 2. PSMT Demographics, Teaching Experience, and Penpals

	Preservice Mathematics Teachers		
	Alvin	Simon	Theodore
Gender	Female	Female	Female
Education Level	Masters in STEM Education	Secondary Education Mathematics	Multidisciplinary Studies
Previous Aspiration	Chemical Engineer Chemical Engineering (two years)	Third Grade Teacher	Nurse
Education Background	Elementary Education Bachelor Degree Summer Camp		Tutoring
Preservice Teacher Teaching Experience	(Elementary) Elementary and Middle School Practicum	Middle and High School Practicum	(Middle and High) Substitute Teacher Job Shadow
Penpals	<i>Dramagirl</i> Shared: <i>Baseballfan</i> <i>Footballfanatic</i>	<i>SoftballQueen</i> (moved away) <i>Dragonfyre</i> Shared: <i>Mr. Popular</i>	<i>Baseballfan</i> <i>Footballfanatic</i> Shared: <i>Dramagirl</i>

Note: The PSMT and penpal names in this table are pseudonyms.

Results

Figure 1. Initial Analysis: Categories, Codes, and Axial Codes Flowchart



Results Continued...

Table 3. Final Analysis: Codes Aligned to Answer Research Questions

	Research Question 1	Research Question 2
1	Feelings	Strategies, Challenges, & Resources
2	<i>I Learned</i>	Feedback
3	Relationships	Definitions & Characteristics
4	<i>I Love Math</i>	
5	Challenges & Suggestions	
6	Challenges, Strategies, & Suggestions	

Note: Codes in italics are in vivo codes.

Conclusions

The PSMTs developed a deep understanding of why it was important to: (a) develop strong relationships with their penpals, (b) create geometry tasks aligned to the geometry standards and their penpals' interests, and (c) provide feedback that encouraged discussion between the PSMT and their penpal. Simon shared, in her individual interview,

As a teacher, I can have such a great influence on my students—even indirectly through letters!

In addition, Simon shared that her penpal,

Dragonfyre, would mention that he thinks math is “very useful.” I found that the encouragement I write in the letters truly makes a difference in the students' perceptions of their abilities to do math. My other student, SoftballQueen, wrote, “Thank you for having confidence in me with math. It really helps me try harder.”

Towards the conclusion of the MLWE, all three participants reported using Google to find mathematical tasks aligned to the appropriate standards. Alvin shared that one of her professors, at the southern university, directed her to multiple online resources. In addition to standard alignment, the PSMTs stated it was important to promote their penpals' interests with each task. Simon shared,

My students showed that they really appreciated how my partner and I related the tasks to their interests. Dragonfyre writes, “I like how you use the things I like in the math problems”

Furthermore, the PSMTs' affirmations seemed to help their penpals feel more self-empowered to do mathematics. The penpals also indicated in their letters that they appreciated the encouragement. Baseballfan wrote to Theodore:

Thank you for the support as well. I'm not dissing my past teachers, but they never give me compliments after usually [sic] like the sixth week, because they already expect the kids to get the answers correct.

Recommendation

Even though all three participants shared an appreciation and love for mathematics, they also shared an aversion to geometry. Future studies might further investigate PSMT's perceptions and feelings associated with geometry.

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