



Apr 14th, 9:00 AM - 10:00 AM

## Activities in the Mathematics Classroom that Promote Mathematical Fluency

Sevasti Tagaris  
*Illinois Wesleyan University*

Leah Nillas, Faculty Advisor  
*Illinois Wesleyan University*

Follow this and additional works at: <https://digitalcommons.iwu.edu/jwprc>

---

Tagaris, Sevasti and Nillas, Faculty Advisor, Leah, "Activities in the Mathematics Classroom that Promote Mathematical Fluency" (2012). *John Wesley Powell Student Research Conference*. 36.

<https://digitalcommons.iwu.edu/jwprc/2012/ESposters/36>

This Event is protected by copyright and/or related rights. It has been brought to you by Digital Commons @ IWU with permission from the rights-holder(s). You are free to use this material in any way that is permitted by the copyright and related rights legislation that applies to your use. For other uses you need to obtain permission from the rights-holder(s) directly, unless additional rights are indicated by a Creative Commons license in the record and/ or on the work itself. This material has been accepted for inclusion by faculty at Illinois Wesleyan University. For more information, please contact [digitalcommons@iwu.edu](mailto:digitalcommons@iwu.edu).

©Copyright is owned by the author of this document.

# Promoting Mathematical Fluency

Sevasti Tagaris and Leah A. Nillas\*

*Educational Studies Department, Illinois Wesleyan University*

## Research Questions

- How can I use reading, writing, and speaking the language of mathematics to promote mathematical fluency?
- What activities help students become “fluent” in mathematics?
- Which activities accomplish targeted learning goals such as initial learning or reinforcement?

## Methodology

- 40 students from two sections of Algebra II classrooms in a Central Illinois urban high school
- Implemented activities, reviewed student work, and analyzed reflective teacher journals
- Lessons emphasized and assessed reading, writing, and speaking mathematics
- Math-Talk community framework was used to analyze how I promote mathematical discourse (Hufferd-Ackles, Fusin, & Sherin, 2004)

## Literature Review

- NCTM (2000) identified learning to communicate mathematically as a major goal for students. When required to justify, students are challenged to think and reason.
- Shield and Swinson (1996) used writing as a means of organizing ideas through “link sheet” activity.
- Huinker and Laughlin (1996) considered the benefit of classroom discourse in exploring concepts with “think-talk-write” activity.
- Discourse aids in writing or writing aids in discourse? Literature lacked evidence on the benefits of the activities.

## Results and Data Analysis

- **Matrix Activity:** By design, this writing activity required justification and encouraged questioning because students’ interactions were limited to writing. This activity reinforced concepts.
- **Board Work:** Students’ work and explanations demanded precision. Through reflection, I noted students’ reluctance to question or be incorrect in front of peers. Board work activities reinforced and assessed understanding.
- **Partner Work:** Students were more comfortable exploring and asking questions during group work. This activity reinforced concepts.

## Activities’ relevance to themes

Activities \ Math-Talk Themes	Matrix Activity	Board Work	Partner Work
Questioning	+	-	+
Explaining	+	+	+
Source of Ideas	-	-	+
Responsibility for Learning	+	+	+ / -

## Conclusion

- Continuing to draw from literature as inspiration and modifying lessons I’ve implemented, there are a number of activities that allow students to practice using math as a language.
- Activities that require written explanations and oral justifications help students develop “fluency.”
- Given more time, I would use levels described in the Math Talk framework to quantify progress across themes.
- In the future, I want to determine through assessment which activities help achieve certain learning goals.

**Figure 1.** The extent to which implemented activities accomplished goals or themes.