Mathematical Meaning-Making in Deaf-Centered Classrooms

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Mathematical meaning is constructed through discourse, not just procedures.

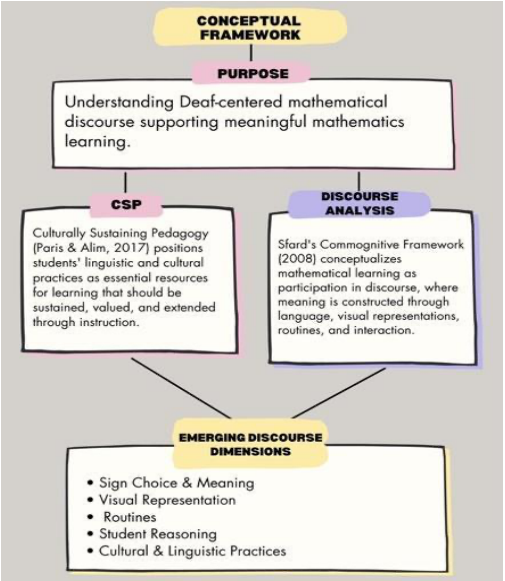
- Language and communication shape mathematical understanding
- Visual representations are part of meaning-making
- Students build understanding through explanation and interaction

Our Study

This work is based on classroom observations in Deaf-centered mathematics settings, focusing on how students construct meaning through discourse, representation, and interaction.

Research Question

How do students construct mathematical meaning through discourse in Deaf-centered mathematics classrooms?



Discourse Dimensions

👋Sign Choice & Meaning – How ideas are expressed
👁️Visual Representation – Use of graphs and diagrams
💬Discourse Routines – Explaining and discussing ideas
🧠Student Reasoning – Making connections and understanding

Classroom Examples

1. 📈 Slope **Challenge:** Students struggled to determine direction and correctly identify rise and run. **Instructional Move:** Graph → trace movement → discuss change → confirm with formula **What Students Revealed:** Slope describes the relationship between two changing quantities. **Look For:** 👁️ Visual Representation 💬 Discourse 🧠 Student Reasoning	**2. 🏊 Positive/Negative Numbers** **Challenge:** Students interpreted negative numbers as symbols rather than meaningful quantities. **Instructional Move:** Model submarine depths → use equations and graphs → discuss meaning in context **What Students Revealed:** Negative values represent positions below a reference point. **Look For:** 👋 Sign Choice & Meaning 💬 Discourse 🧠 Student Reasoning	**3. ➗ Fractions** **Challenge:** Students struggled to understand fraction subtraction when the result was negative. **Instructional Move:** Use visual models → explain quantities through signing/writing → connect models to symbols **What Students Revealed:** Negative fractions represent meaningful quantities and can be justified through multiple representations. **Look For:** 👋 Sign Choice & Meaning 👁️ Visual Representation 💬 Discourse 🧠 Student Reasoning

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Takeaways

From Procedure to Meaning

Procedural vs Conceptual understanding across examples highlights how meaning develops through explanation, representation, and discourse. What changed: language, representation, discourse, and context.

How Mathematical Meaning Develops

Teachers create opportunities through language, visual representation, and discourse. Students construct meaning by explaining ideas, connecting representations, and justifying reasoning.

Practices for Teachers

What to Look For?

1. Are students explaining meaning or just answers?
   How are visual representations used?
2. What do explanations reveal?
3. How do students build on each other's ideas?

Reflection

1. Where can you deepen meaning-making?
2. How are students expressing ideas?
3. How do discussions support understanding?