

**Department of Mathematical Sciences  
Colloquium**

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The University of Texas at El Paso

**MODES OF REASONING WITH MATRIX AND LINEAR  
ALGEBRA CONCEPTS**

I will talk about the aspects of students' reasoning documented in light of Sierpinski's framework on thinking modes. A qualitative analysis process revealed that, in concrete (traditional) questions that do not require generalization/abstraction, students' responses included various geometrical aspects of vectors and planes in  $R^3$ . When answering more abstract questions requiring conjecture and generalization, many of the responses however fell back on the algebraic and arithmetic modes. Despite this fact, the notable number of participants made arguments using multiple modes in their responses; numerical, algebraic and geometrical. As for the effect of geometric representations on learning, geometric representations may not replace one's arithmetic and/or algebraic modes but they may become catalyst for students to begin considering multiple modes.

**Friday, January 22, 2010 at 3 pm in Bell Hall 143**

**The University of Texas at El Paso**

Refreshments will be served in front of the colloquium room,  
15 minutes before the start of the colloquium.