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John Hannah and **Sepideh Stewart***, 601 Elm Avenue, Norman, OK 73019, and **Michael Thomas**. *Teaching Linear Algebra with Clickers in three Worlds of Embodied, Symbolic and Formal Mathematical Thinking.*

Linear algebra is one of the first advanced mathematics courses that students encounter at university. Research shows that although many students find the calculation side of the course, specially manipulating matrices relatively straightforward, they lack the theoretical understanding of basic linear algebra concepts. In this research we have employed Tall's framework of three worlds of embodied, symbolic and formal mathematical thinking to analyse students' thinking processes and suggest ways forward in teaching linear algebra. As part of this study, we integrated clickers into teaching two groups of linear algebra students to investigate whether the order (formal definitions and theorems, symbolic representations, pictures and geometry) in which the main linear algebra concepts are presented has an impact on students' learning. (Received September 17, 2013)