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A group of mathematicians and mathematics education researchers have been investigating ways to incorporate research on the teaching and learning of mathematics to shape instruction in upper division undergraduate linear algebra courses. In this session we will provide an assignment on linear maps that was designed with attention to learning theories. The assignment culminated with the problem: Prove that if $W \subseteq U, V$, all vector spaces, and $T : W \rightarrow V$ is a linear map, then there exists $S : U \rightarrow V$, a linear map such that $S(\alpha) = T(\alpha)$ for all $\alpha \in W$. The module was used in an advanced linear algebra course at a Midwestern land grant university. We will describe the development of the module and share our analysis of student thinking processes in terms of a learning theory. We also will discuss how the interaction of mathematics education researchers and mathematicians has influenced the thinking of both about the teaching and learning of undergraduate mathematics. The work was supported in part by NSF DUE-0837050 (Received September 17, 2011)