

**Meeting:** 1003, Atlanta, Georgia, MAA CP V1, MAA Session on Research on the Teaching and Learning of Undergraduate Mathematics

1003-V1-800      **Jacqueline M. Dewar\*** (jdewar@lmu.edu), Loyola Marymount University, Department of Mathematics, 1 LMU Dr.; Suite 2700, Los Angeles, CA 90045, and **Curtis D. Bennett** (cbennett@lmu.edu), Loyola Marymount University, Department of Mathematics, 1 LMU Dr.; Suite 2700, Los Angeles, CA 90045. *A Tool for Describing Students' Journey to Proficiency in Proof.*

This paper reports the results of a study of how students' understanding of proof evolved as they moved through the mathematics major curriculum at Loyola Marymount University. The study took a snapshot of students' progression through the major at one point in time as opposed to being a longitudinal study of individual students or of a cohort. We employed a "proof-aloud" methodology (with 12 students spanning the major and one faculty member serving as expert) on a number theory statement. To fully describe the work of our students, we developed a mathematical knowledge-expertise grid that contains two affective (interest and confidence) components and six cognitive (factual, procedural, schematic, strategic, epistemic, and social) components of learning. Across these eight components we have described three stages of expertise: acclimation, competence and proficiency. In applying this grid to student work we found support for several hypotheses about student learning and implications for teaching practice that we will report. (Received September 29, 2004)