

1106-VS-997 **Tetsuya Yamamoto*** (yama3@ou.edu), yama3@ou.edu. *Analysis of Student's Proofs in Light of the Structure of Proof Construction.*

This report explores sources of students' difficulties with proving and provides pedagogical suggestions to help students with proving. The target population was undergraduate students enrolled in undergraduate analysis, algebra, and topology in a large research university. There were a total of 81 proofs collected from students' mid-term, final exams, and in-class problem solving sessions. Those proofs were analyzed in light of the structure of proof construction. The structure of proof construction is a model of proof construction, which provides a comprehensive view that can encompass the aspects, factors, patterns, and features involved in cognitive processes in proof construction across mathematical subjects. The model was useful in explaining sources of students' difficulties with proving and indicated that each mistake or impasse might be caused by more than one factor. The analysis of the students' proofs revealed how students' difficulties might occur and what might hinder them from properly advancing a reasoning process. The findings led to the hypothesis that the knowledge of the structure of proof construction may serve as methodological and metacognitive knowledge to help students with proving. (Received September 16, 2014)