

1096-VQ-1082 **Tetsuya Yamamoto*** (yama3@ou.edu), Norman, OK 73019. *Analyzing Students' Difficulties with Proving in Light of the Structure of Proof Construction*. Preliminary report.

This study aims to investigate student's difficulties with proving in light of the structure of proof construction and to provide practical suggestions for pedagogical purposes. The main target population in this study was those students in Introduction to Algebra, Analysis, and Topology. In analyzing their proofs, this study offers two frameworks: (a) for modeling the structure of proof construction; (b) for analyzing students' difficulties in proving. The data was collected through students' exams, in-class and individual problem-solving sessions. So far, the results indicate the following as possible major causes of students' difficulties: (1) mismanagement of the conclusion of the given statement, (2) lack of knowledge of key concepts including their definitions, notations, and meanings, (3) lack of tenacity to try to rephrase an object, (4) lack of precision in dealing with an object. The results led to the conjecture that the knowledge of the structure of proof construction itself could help students advance their reasoning processes in proving. The findings of this study may contribute to what could be taught in both proof-based and transition to proof courses. (Received September 12, 2013)