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This talk is based on a study that examined the use of journal writing by undergraduates in an Honor's Number Theory course and how the journals supported students' learning of number theory and proof writing.

The course allows students at different levels of mathematical maturity to participate and work together. It also provides a context for students to learn how to explore problems deeply and give careful, rigorous mathematical proofs. Students learn to explain their ideas both orally and in writing, and how to apply the mathematics learned to different types of problems.

The 17 undergraduates in this course submitted weekly journals online to their instructor and reflected on their mathematical learning. The instructor then provided comments to each of the students' journal submissions that informed him of each student's successes, challenges, issues, and questions. We analyzed the journals and share our preliminary findings on what the journal writing revealed about students' learning and how their mathematical understanding developed over a semester. In addition, we include results of the pre-post survey of student attitudes toward mathematics along with interviews of 4 of the students that give additional insight into their experiences in the course. (Received September 14, 2014)