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HOW DO STUDENTS ACQUIRE AN UNDERSTANDING OF LOGARITHMIC CONCEPTS? (332 pp.)

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The use of logarithms, an important tool for calculus and beyond, has been reduced to symbol manipulation without understanding in most entry-level college algebra courses. The primary aim of this research, therefore, was to investigate college students' understanding of logarithmic concepts through the use of a series of instructional tasks designed to observe what students do as they construct meaning. APOS Theory was used as a framework for analysis of growth.

APOS theory is a useful theoretical framework for studying and explaining conceptual development. Closely linked to Piaget's notions of reflective abstraction, it begins with the hypothesis that mathematical activity develops as students perform actions that become interiorized to form a process understanding of the concept, which eventually leads students to a heightened awareness or object understanding of the concept. Prior to any investigation, the researcher must provide an analysis of the concept development in terms of the essential components of this theory: actions, process, objects, and schemas. This is referred to as the genetic decomposition.

The results of this study suggest a framework that a learner may use to construct meaning for logarithmic concepts. Using tasks aligned with the initial genetic

decomposition, the researcher made revisions to the proposed genetic decomposition in the process of analyzing the data. The results indicated that historical accounts of the development of this concept might be useful to promote insightful learning. Based on this new set of data, iterations should continue to produce a better understanding of the student's constructions.