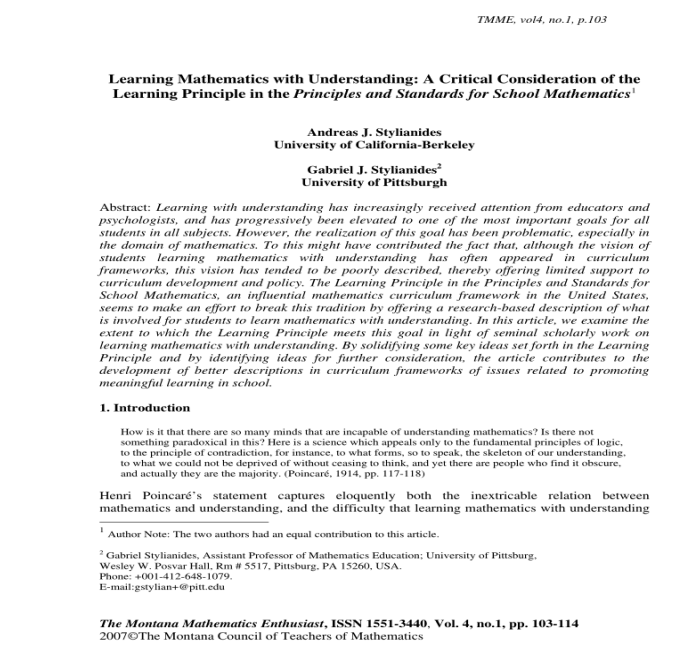
# The IEA Study Of Mathematics II: Contexts And Outcomes Of School Mathematics





**Learning Mathematics with Understanding: A Critical Consideration of the Learning Principle in the *Principles and Standards for School Mathematics*[1]**

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Abstract: *Learning with understanding has increasingly received attention from educators and psychologists, and has progressively been elevated to one of the most important goals for all students in all subjects. However, the realization of this goal has been problematic, especially in the domain of mathematics. To this might have contributed the fact that, although the vision of students learning mathematics with understanding has often appeared in curriculum frameworks, this vision has tended to be poorly described, thereby offering limited support to curriculum development and policy. The Learning Principle in the Principles and Standards for School Mathematics, an influential mathematics curriculum framework in the United States, seems to make an effort to break this tradition by offering a research-based description of what is involved for students to learn mathematics with understanding. In this article, we examine the extent to which the Learning Principle meets this goal in light of seminal scholarly work on learning mathematics with understanding. By solidifying some key ideas set forth in the Learning Principle and by identifying ideas for further consideration, the article contributes to the development of better descriptions in curriculum frameworks of issues related to promoting meaningful learning in school.*

**1. Introduction**

> How is it that there are so many minds that are incapable of understanding mathematics? Is there not something paradoxical in this? Here is a science which appeals only to the fundamental principles of logic, to the principle of contradiction, for instance, to what forms, so to speak, the skeleton of our understanding, to what we could not be deprived of without ceasing to think, and yet there are people who find it obscure, and actually they are the majority. (Poincaré, 1914, pp. 117-118)

Henri Poincaré's statement captures eloquently both the inextricable relation between mathematics and understanding, and the difficulty that learning mathematics with understanding

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a study of school subjects, and is contempiating a study of social val- ues and moral.Abstract. The study explores attitudinal concomitants of school achievement in a comparative perspective. is IEA's Second. International Study of Mathematics Achievement (SIMS), for which data cross-cultural differences in educational outcomes. While such The IEA Study of Mathematics II: Contexts and Outcomes.