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**Conditions for promoting reasoning in problem solving: insights from a longitudinal study.**

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Summary: This paper describes insights on how to promote mathematical reasoning in problem solving based on the mathematical experiences of participants in a long-term study in which the students engaged in strands of well-defined, open-ended mathematical investigations, as a context for research on the development of particular concepts and ways of reasoning. Over the years, the students demonstrated ways of working in which sense making became a cultural norm and collective and individual sharing and justifying of ideas was a common practice. The paper examines the environment that enhanced the development of these and other qualities. The insights address aspects of task design and researcher role in the students' mathematical activity. Both were central in enhancing the students' engagement in thoughtful and meaningful problem-solving activity. The paper addresses the relationship between problem solving and mathematical reasoning from the perspective of the long-term study and provides an examination of students' problem solving over time, both from a behavioral and introspective perspective.

*Classification:* C33 C34 D53 D54 C73 C74

*Keywords:* problem solving; mathematical reasoning; proof; proving; justification; mathematical behavior; learning; longitudinal studies

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