ABSTRACT. In this paper, it is contended that in order to understand individual student's learning in the complexity of the mathematics classroom it is necessary to examine the events that occur before, during, and after learning. To illustrate, the process by which two children each construct new mathematical meanings is examined in this manner. The detailed analyses of each of these events provides insight into the processes by which individual students construct mathematical meanings in classroom settings. The investigation also reveals that the underlying social norms differ from those found in traditional classes, and that this creates different opportunities for learning. It is contended that it is the differences in the norms that have been established in their respective classes that distinguishes between the events in learning for the two children.

It is currently well accepted, by those involved, that improving the quality of mathematics education in the United States involves a change in the perception of the nature of mathematics and what it means to engage in mathematical activity in schools. This alteration is not trivial as it involves a significant divergence from a long standing tradition in the practice of school mathematics. As Romberg (1992) contends there needs to be a shift from the “notion that mathematics is a set of rules and formalisms invented by experts, which everyone else is to memorize and use to obtain unique correct answers” (p. 453) to a view that learning mathematics involves processes of abstraction, inference and logical reasoning. From this perspective, it is recommended that doing mathematics in school involve more than efficient calculations; it should instead emphasize constructing mathematical meaning.

This shift in view of what it means to learn mathematics in school has been informed by research on children's cognitive development of mathematics, and in particular their arithmetical ideas (e.g., Labinowicz, 1985). This line of research has provided many valuable insights into the ways in which children interpret their experiences to make sense of mathematics. In addition, others such as Confrey (1987) contend that substantive learning of mathematics occurs in those situations in which children experience conflict with their previous ways of knowing. These contradictions are resolved as children engage in what Piaget (1985) referred to as reflective abstraction, and Dewey (undated) as reflective thinking.
However, in order to engage children in situations in which abstract reflective thinking about their mathematical experiences occurs suggests a different kind of classroom setting than currently exists in most schools. Kamii (1985) argues that the nature of the environment in mathematics classrooms greatly influences children's interest and motivation for learning. In settings in which students are discouraged from engaging in autonomous thinking and resolving conflicts in their reasoning creates fewer opportunities for children to construct personally meaningful mathematics.

Generally, the research which focuses on the affective aspects of cognition when applied to schooling is considered only from the standpoint that it provides teachers with strategies or techniques for attempting to interest students in the topic at hand. However, research on affect potentially could contribute more to the understanding of children's learning. This becomes evident when one considers that to engage in thinking which is challenging, fraught with ambiguity, and involves reflective activity necessarily requires students to feel confident in their ability to make sense of problematic situations. Much of the evidence from research on achievement motivation indicates that students who are in those settings that encourage autonomy and task orientation do have a greater understanding of mathematics (e.g., Nicholls, 1983).

Moreover, Rogoff (1990) notes that different patterns of interaction occur in accordance with the nature of the situation which in turn influences children's learning. In this regard, she believes that the variation in the ways in which adults and children interact influences the nature of cognitive development. That is, whether it involves learning of "skill and understanding" or a "shift in perspective". Thus, she contends that situations in which the intention is for children to learn skills or the goal is for them to make transformations in their thinking can be characterized by different types of interaction.

Along with Rogoff's view are those studies which emphasize the importance of social interaction, but from the perspective of considering the ways in which the classroom is organized socially. Voigt (1985) contends that the expectations and obligations which are mutually constituted form the basis from which individuals develop the routines that guide their actions and create stability and consistency in the ways in which they interact. These ways of interacting that occur and reoccur, form the underlying regularity and predictability of classroom life.

This regularity enables students to maintain continuity in their daily activity without the necessity of continually deliberating among various options for action. The manner in which the interaction occurs is seen