Summaries of Readings for Session 2:

Moschkovich, J. (2002). A situated and sociocultural perspective on bilingual mathematics learners. *Mathematical Thinking and Learning, 4,* 189–212.

In this article, Dr. Moschkovich discusses three perspectives on bilingual mathematics learners. The first perspective focuses on acquisition of vocabulary and the second focuses on the mathematical register. After discussing how these two perspectives can provide some analytical tools for describing some aspects of how bilingual students learn mathematics, Dr. Moschkovich describes how a third perspective,the situated-sociocultural perspective, can inform research in this area. She argues that this perspective that focuses on Discourses and a situated-sociocultural view of mathematics cognition, language, and bilingual learners can provide researchers and practitioners with a more detailed and complex view of how bilingual students learn mathematics. Through an analysis of two mathematical interactions, Dr. Moschkovich illustrates how this perspective can provide a more complicated understanding of how bilingual students learn and communicate mathematically. She points out to several aspects of how bilingual students communicate mathematically that cannot be visible with any of the two first perspectives. Dr. Moschkovich concludes with implications for the instruction of bilingual learners in mathematics.

Moschkovich, J. (2005). Using two languages when learning mathematics. *Educational Studies in Mathematics, 64,* 121-144.

In this article, Dr. Moschkovich draws on research studies in psycholinguistics and sociolinguistics to consider how they might be relevant to research on bilingual mathematics learners. Studies from psycholinguistics and sociolinguistics differ in how they explain and explore language practices. Psycholinguistics views language as an individual cognitive phenomenon, while sociolinguistics focuses on the social nature of language and stresses that language is simultaneously individual, cultural, social, and situated. After outlining these two theoretical perspectives, Dr. Moschkovich gives an overview of how the definitions of terms such as bilingualism and code-switching have evolved in the literature and what the current understandings of these terms are. Next, she reviews research studies from psycholinguistics and sociolinguistics. In this review, Dr. Moschkovich describes how studies in psycholinguistics have focused on comparing monolinguals to bilinguals who use two languages during arithmetic computations. In addition she describes how studies in sociolinguistics have focused on describing how bilingual learners communicate using two languages and provides insights as to how sociolinguistics can inform analyses of bilingual mathematical conversations. She argues that future research on bilingual mathematics learners should consider the cognitive advantages of bilingualism found by psycholinguists that relate to mathematical thinking, such as translation skills and selective attention. However, she suggests that research should move away from comparing bilinguals to monolinguals and from considering monolingualism as the norm. Instead, future research on bilingual mathematics learners should ground its analyses of classroom discussions in ethnographic observations of classroom interactions and focus on describing how bilingual learners communicate

mathematically. She concludes that code-switching should not be viewed as a deficiency and that research and practice with bilingual learners of mathematics should focus on the resources that these learners use to communicate mathematically.

Moschkovich, J. (2007). Examining mathematical discourse practices. *For The Learning of Mathematics. 27,* 24-30.

In this article, Dr. Moschkovich uses a situated-sociocultural perspective on the learning of mathematics to consider the features of everyday and academic Discourse practices. She analyzes an episode of a mathematics lesson in a third grade bilingual classroom and uses it as a window into several features of Discourse practices and mathematical Discourse practices in particular. She defines academic mathematical Discourse practices as talking, thinking, and participating in mathematical practices that are "the objective of school learning" through the use of language and other symbol systems. Dr. Moschkovich describes the characteristics on academic and everyday mathematical discourse practices and argues that everyday discourse practices and experiences with natural phenomena can be resources for communicating mathematically. She concludes by pointing out that if we assume that academic mathematical Discourse is confused with "formal" or "textbook" definitions "we may miss the mathematical competence in student contributions."

Saxe, G. B (1988). Candy selling and math learning. *Educational Researcher,* 17 (6), 14-21

In this article, Saxe points to the differences between in-school and out-of-school mathematical practices and to the fact that mathematics learning does not only take pace in the classroom. Through his description of a multi-methods study of the mathematical practices of Brazilian child candy sellers, he examines how these children form mathematical understandings in their out-of-school activities. The findings of this study provide various insights on the interplay between informal and school mathematics learning. Specifically, findings show that candy sellers with little or no schooling use complex mathematical practices in their every day activity that are in contrast with school mathematics. Moreover, findings show that unschooled candy sellers draw from their every day selling practices to solve school mathematics problems, while schooled sellers use very limited aspects of school mathematics to solve problems in their selling practice. Saxe concludes this article by arguing for the need to investigate how educators can make school mathematics more transparent and accessible to children as they pursue to solve problems in their every day out-of-school practices.

Perkins, I. & Flores, A. (2002). Mathematical Notations and Procedures of Recent Immigrant Students. *Mathematics Teaching in the Middle School,* 7 (6), 346-351.

In this article, Perkins and Flores, challenge the idea that mathematics is a universal language by describing differences in mathematical notations and procedures that exist in different countries, particularly Latin American countries. They argue that exposing

teachers to the differences between the ways mathematical ideas are represented in immigrant students' countries of origin from the way these ideas are represented in the United States will expand their repertoires and give them an appreciation of their students' previous experiences. In addition, the authors provide recommendations of how teachers can use these differences in the classroom for the advantage of their students.