Classrooms are complex social settings, and research that seeks to understand the learning that occurs in such settings must reflect and accommodate that complexity. This accommodation can occur if your data collection process generates a sufficiently rich data set. Such a data set can be adequately exploited only to the extent that the research design employs analytical techniques sensitive to the multifaceted and multiply-connected nature of the data. The challenge for this type of classroom research is to portray teaching and learning as these occur in the highly complex social context of the mathematics or the science classroom. In order to meet this challenge, we had to develop a methodology that was in harmony with our theoretical orientation to the classroom. If we, in fact, approach social settings (and the situations they frame) as multiply-constructed and open to multiple construal, then the methodology employed in their study must offer a voice to the several participants in these settings and avoid the identification of authority with any one voice (even that of the Researcher). We must avoid the threat of over-simplification of setting or situation; a threat more likely to be realised if we were to commit to a single interpretation. Instead, we need to acknowledge the multiple potential meanings of the situations we are studying by deliberately giving voice to many of these meanings through accounts both from participants and from a variety of “readers” of those situations. The implementation of this approach requires the rejection of consensus and convergence as options for the synthesis of these accounts, and instead accords the accounts “complementary” status, subject to the requirement that they be consistent with the data from which they are derived, but not necessarily consistent with each other, since no object or situation, when viewed from different perspectives, necessarily appears the same.

Complementary Accounts Methodology, as we have developed and applied it (Chapter 2, and Clarke, 1998), is distinguished from other approaches to classroom research by:

- The nature of the data collection procedures, leading to the construction of "integrated data sets" combining videotape and interview data,
- The inclusion of the reflective voice of participant students and teacher in the data set,
An analytical approach that utilises a research team with complementary but diverse areas of expertise to carry out a multi-faceted analysis of a common body of classroom data.

The object of our research was the integrated documentation of not just the obvious social events that might be recorded on a videotape, but also the participants’ construal of those events, the memories, feelings, and actions invoked, and the mathematical/scientific and social meanings and practices which arose as a consequence. The research procedure recounted here was designed explicitly to achieve this integration.

Each member of the research team was encouraged to select from and interpret the data sets from a distinct, carefully articulated, theoretical perspective. The goal of this process was complementarity rather than consensus, and each researcher’s interpretation was subject to the same criteria of coherence, consistency with the videotape data, and plausibility. The synthesis of such accounts is not a matter of unification through consensus into a single account, but rather the interweaving of accounts providing in their combination a richer portrayal of the classroom. Further, an interpretation from one perspective may support, inform, justify and even explain the account constructed from another perspective. While you, the reader, will carry out the most important synthesis of our analyses, one synthesis is provided in Chapter 12.

The authors of the chapters in this book report their analyses of a common body of classroom videotape and interview data relating to four mathematics lessons and four science lessons selected for analysis from the substantial data set generated by the Classroom Learning Project, based at the Faculty of Education, University of Melbourne, Australia (see Appendix A). The method of data collection and the rationale of lesson selection are given in chapter two.

Each researcher or pair of researchers has subjected the data to an analysis informed by a particular theoretical perspective and consistent with the specific research expertise of that individual or team. While the lessons that constitute the primary data source took place in Australia, the Classroom Learning Project has been an international research effort and the participating researchers come from Australia, New Zealand and the United Kingdom. A key feature of our portrayal of the classroom is the juxtaposition of researchers’ quite different theoretical emphases. Our portrayal (the content of this book) derives its coherence and focus from the shared concern of all researchers with the construction of meaning and practice in the mathematics and science lessons studied and our interest in furthering our understanding of the discourse options and the operative practices within mathematics and science classrooms, how these position participants, and how discourse and practice appear to facilitate or inhibit the learning of mathematics and science.

The most obvious source of coherence in our work is provided by the common data base accessed by all researchers, allowing the research team and the readers of this book to consider the compatibility and utility of conceptually independent analyses of the same data. While each analysis has its own message and integrity, what benefit do we, as a community of educators, derive from the combination of