# Preface to Part XI

## DNR-Based Instruction in Mathematics as a Conceptual Framework by Guershon Harel

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The school is the institution conceived to communicate, re-produce, and appropriate the knowledge that is socially important. The curriculum is the basic instrument to reach this goal. Of course, *socially important* depends on a long list of factors that includes political, cultural and historical factors as well. Mathematics education has been an important institutional goal. The centrality of this goal has been captured in the field of research we call math education.

The present development of our field is offering a diversity of approaches that reflects the complexity of this enterprise. Many authors have expressed their concerns with this state of affairs. For instance, J. Middleton et al. (2004) wrote: "we must project an agenda for action by which we can define our own direction, our own standards of rigor, and our own central research questions through which we mature as a field of inquiry". While our field has made substantial progress in the past years thanks to the identification of basic research problems, new levels of complexity have come to the forefront (English 2008). The answer from the field has been the construction of diverse communities of practice. Guershon's chapter aptly explains how he has designed his conceptual framework. He belongs to the community of mathematics education researchers who believe in the *integrity* of mathematical knowledge as has been discussed by Goldin (2003). Besides attention to theory and philosophy which may lead to understanding problems of teaching and learning, Guershon's explicit intentions lead to consider the centrality of mathematics contents in his framework. In this framework, learning is learning mathematics. This emphasis comes from his concerns with those studies wherein math thinking is not an intrinsic piece of the endeavor. The DNR-based instruction in mathematics—as this framework is called—closely follows Piaget's conception of learning as adaptation directed toward the conquest of equilibrium that, at the end, results in an iterative process of subsequent stages of temporary equilibria. Another important component of the DNR framework is the quest for epistemological control through the investigation of students' understanding and production of mathematical proofs. Moreover, Guershon introduces a fine point when he discusses knowledge as the

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complex consisting of all ways of understanding and thinking that take place institutionally. In our view, this offers an opportunity for further development of the DNR framework because institutions are cultural artifacts.

This work provides a sound overview of the DNR framework with plenty of conceptual constructs. It offers the mentioned framework as a basic instrument for the community of practice and research with which Guershon shares his position, namely, the one that conceives of mathematical knowledge as the starting point to answer questions like what is the mathematics that should be taught at schools and how should that mathematics be taught. We cannot go at length to describe the framework but we expect that what we have said constitutes an invitation for the reader to plunge into the paper with the confidence she will find not just food for thinking but useful theoretical lenses for researchers and students to observe significant aspects of learning and teaching mathematics.

## References

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