

CHAPTER 3  
EXPERIMENTAL DESIGN

OVERVIEW

We begin analyzing the diagram of an experimental setting design for the observation of algebra learning and teaching phenomena. In this chapter we discuss a manner of studying the evolution and development of algebraic ideas through historical and epistemological analysis (based on the analysis of ancient pre-symbolic algebra texts), which in turn serves as a point of departure for experimental design in mathematical education for the particular case of the transition toward algebraic thought. The phenomenological analysis, as presented in general terms in Chapter 2, is applied to the case of algebraic language and to that of school algebra (didactic phenomenology). Here once again the notions of *mathematical sign system* and of *language strata* become relevant, especially when the historical analysis touches upon the genesis of modern algebra thus re-broaching the elements that correspond to said notions presented in Chapter 2. The chapter consists of the following sections: 1, Introduction; 2, Experimental observation; 3, On the role of historical analysis; and 4, The phenomenological analysis of school algebra.

1. INTRODUCTION

In this chapter we present two diagrams that give a general description of the design of a study in accordance with the guidelines of our research program (diagram A), and the general form of the development of the study (diagram B). In the rest of the chapter, we specify some of the terms used in those diagrams and set out in more detail how the historical analysis of algebraic ideas and phenomenological analysis intervene in it.