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INTRODUCTION

This book presents several works in the field of mathematics didactics revolving around secondary school and university teaching. The specificity of the research studies in question is that they attribute as much importance to the actors (students and teachers) as to the mathematics and the school situation. These studies fit well in the very general framework of Activity Theory.

The presented researches aspire to analyze what is at play in a mathematics classroom, by varying the school situations, the environments, the contents, the teachers and the classrooms. The main objective is to study, understand, and even interpret the links between the teaching of a given mathematical content and the corresponding student learning. We seek to highlight regularities and variations of these processes in order to better understand students' acquisitions, and interpret the teachers' practices. The work as a whole leads to inferences which can contribute to the professional development of teachers by widening the range of possible activities for each teacher.

The general framework of Activity Theory, with associated development theory, is described in chapter 1, and we directly clarify how this work fits in this framework. The analyses of students' in-class activities, as they are organized by the teachers, provide us with data which allow us to tackle teachers' practices and approach students' learning: the general theory accounts for this focus and the corresponding reality splitting. Nevertheless, the way activities are assigned to mathematics and school situations is not very present in the framework of Activity and development theories. Therefore, the necessary theoretical and methodological complements are presented in chapter 2.

The main concern of this book is however not theoretical, even though its specificity borrows elements from Activity Theory and development theories which complement typically didactical tools. We seek to assign to the singular subjects (students and teachers) their place within the didactical relationship, even though the affective and social factors are not directly accounted for, despite their high importance. We develop the means to collect and analyze in a significant way, adapted to our project, data about teaching and learning allowing us to interpret the relationship between the two.

All the research studies of this book follow a common methodology presented in chapter 2, but involve, of course, indispensable adaptations which are introduced gradually. They pertain to the teaching of mathematics in middle school, high school, or the first two years of university. Some works are the fruit of individual research[1] and handle a small number of cases in an exhaustive manner, often over quite short periods of time. Others works are clusters of research studies or the fruit

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of collective research based on larger data and oriented more directly towards results which are relevant for the general research question of the book. In any event, there is always a limit to the hasty generalizations of results. Hence, there are neither definitive results nor (even less) prescriptions in our discourse.

In chapters 1 and 2, we present the theoretical frameworks and the tools used in the book, while stating the specificity of our research. Chapters 3 and 4 are concerned with the results about teachers' practices in "ordinary" classrooms. They highlight the stability of teachers' practices and also account for the diversity and variability between the teachers. Chapter 5 deals with teaching manuals and shows that exercises proposed in these manuals do not offer the teachers opportunities to diversify their student activities. Chapters 6 and 7 refer more directly to teachers' practices in relation with students' activities. Chapter 8 focuses on the activity of students in a specific teaching situation in a computerized environment. Chapters 9 and 10 deal with teachers' practices in computerized environments, in particular the comparison of teachers' activities in different environments. Chapter 11 is a large scale study about teachers' practices and the factors related to the regularity and variability of the practices. Last, chapter 12 comes as a synthesis of the book with an opening on professional development of teachers.

The different chapters can be read in a relatively independent way. In particular, it is not necessary to complete an exhaustive reading of chapters 1 and 2 in order to read the other chapters … and vice versa!

NOTES

[1] All the researchers who contributed to this book, apart from Aurélie Chesnais, Eric Roditi and Janine Rogalski, are members of the Laboratoire de Didactique André Revuz (LDAR) at Paris Diderot University

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