

## **PHD Dissertation on Teachers' Convictions on Mathematical Infinity**

**by Silvia Sbaragli**

I have read carefully the dissertation on “Teachers’ convictions on Mathematical Infinity” and I believe that it is a piece of really good work. First, the researcher deals with infinity, a very interesting topic on mathematics education. Although the topic has been well studied, it still represents a fascinating topic in mathematics and constitutes a primal interest for scholars. Second, the dissertation’s focus on teachers’ ideas on infinity provides a deeper understanding in their teaching and therefore can suggest ways on improving teaching on infinity.

The dissertation is well structured and organized into four chapters. The first chapter provides a chronological outline and shows the evolution of the concept of mathematical infinity. Special attention is given to the epistemological obstacles that made infinity such a difficult topic to be learnt. The historical analysis of the idea of infinity is well defined and detailed, covered more than forty pages, giving the same time the reader the opportunity to visualize the historical evolution of the concept. The researcher starts the historical approach to infinity from the early beginning. The approach stretches back to the work of the Thales and Anaximander of Miletos, continuing with the work of Aristotle and Euclid. The researcher makes a special reference to infinity in the Renaissance and then to the work of Bernard Bolzano. The historical study of infinity ends with a very detailed description of the work of Cantor.

In the second chapter of the dissertation, the researcher provides a brief description of the present research in Didactics of Mathematics, focusing in the work of the French School. The researcher refers to the fundamental didactics, while analyzing the “triangle of didactics”. Chapter starts with an introduction to the didactical contract, the images and models of mathematical concepts. In addition, the researcher discusses the idea of

conflicts and misconception and then provides a detailed description of the didactic triangle and its implementations in the didactics of mathematics.

The next two chapters (3 and 4) describe the core of the research work. In the third chapter, the researcher provides a detailed description of primary school teachers' convictions on mathematical infinity. After a short description of theoretical framework, the researcher states the research hypotheses and describes the research methodology, which is quite well orchestrated. The research methodology combines well both quantitative and qualitative methods of analysis, to provide a well documented view of primary school teachers' convictions on mathematical infinity and how these obstacles deriving from the intuitive models provided by teachers to their students. The questionnaires provided to teachers are well presented and discussed in the study. As this research seems to be of great interest, I suggest in the future administering the above-mentioned questionnaires to a greater number of participant teachers.

The results are well analyzed and presented and provide answers to the research questions.

The fourth chapter is based on the focus of the research, namely the aim to propose a learning pathway that envisages specific training courses for teachers, that focus on the intuitive models related to infinity. The researcher particularly focuses on teachers' and students' misconceptions and intuitive models on geometrical primitive entities surveyed from different points of view.

As a concluding remark, this dissertation deals with infinity, an interesting and fascinating topic, from the perspective of teachers' convictions. The researcher provides an analytical historical approach to the topic and covers the concept of infinity by providing an accomplished theoretical framework. The research questions and methodology are well documented and cover the study's needs. Some little further improvements in the research methodology and concluding remarks would also better the high quality of the present study.

For all the reasons described above I fully agreed that the present text is a very good research text and that that the candidate Sbaragli Silvia fully merits the title of Dr on Mathematics Education.

Athanasios Gagatsis

Professor, Mathematics Education

Department of Education

Vice Dean, School of Social Sciences and Sciences of Education