

Mathematics education and deductive reasoning

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Abstract of master thesis

For many years it has been commonly believed that learning mathematics develops deductive reasoning. However, this belief has not yet been verified by substantial empirical research. This research approaches this issue differently. Its objective is to study the conceptions that people involved in mathematics education, logic, and mathematics have regarding the connections between mathematics learning and the development of deductive reasoning. Individual semi-structured interviews were conducted with 21 interviewees. The interviews lasted between one to two hours, and focused on different issues related to the topic of the research. The interviews were analyzed according to the qualitative method of Grounded Theory. It was found that all interviewees argued that learning mathematics has an influence on the development of deductive reasoning. In addition, they all pointed out that the development of deductive reasoning is one of the objectives of mathematics education. However, analysis of the interviews reveals that the interviewees attribute different meanings to these sayings. Five aspects related to the issue of deductive reasoning and the role of learning mathematics in its development were constructed, based on the data. Different approaches regarding each aspect are discussed. These aspects are: 1) What is deductive reasoning? 2) What are the relationships between the nature of logical rules inside and outside mathematics? 3) What is the role of deductive reasoning in doing mathematics? 4) What does learning mathematics develop in deductive reasoning? 5) In what ways does learning mathematics develop deductive reasoning? Three distinct groups of interviewees were identified, with the members of each group consistent in their conceptions regarding each aspect. It seems that the differences between the ways in which the three groups perceive the development of deductive reasoning through teaching mathematics are mainly related to the way they perceive the concept of deductive reasoning.