

The Subject of Mathematics

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What is the subject of mathematics?

A sociological approach¹ to this broad question would entail providing an account of the meaning associated to mathematics as a subject discipline within educational institutions and of how such meaning is in turn related to the enactment of the discipline itself. This general problem can be further accosted at two main levels. On the one hand, one may look at how mathematics and its meaning are defined or delimited within official or influential documents and how these are related in turn to how mathematics is or should be performed. On the other hand, one may empirically investigate individual and social discourses articulated around mathematics and how these relate to people's practices. These two dimensions complement each other. Indeed, a solely institutional account of mathematics would remain largely ideal and formal without also investigating the people who are actually involved with it. On the other hand, an exclusively empirical account of people and groups would remain incomplete without inscribing it more broadly within the institutional context in which they participate. Moreover, fundamentally, any understanding of mathematics' meaning (be it institutional, personal or social) carries with it an understanding of what counts as correct or incorrect or simply as mathematical and non-mathematical and hence

¹ In the sense of Weber (2019, p. 78). In general, according to Gellert (2020), sociological approaches in mathematics education "have a rather short history. They are offering vigorous and fresh perspective, and they have received increasing attention during the last 25 years. By using methods of empirical investigation and critical analysis, they engage with the complex relationships between individuals, groups, knowledge, discourse, and social practice, aiming at a theoretical understanding of social processes in mathematics education. These relationships are often conceived as tensions between the micro level of individual agency and interaction and the macro level of the social structure of society. The institutions of mathematics education and their functioning, often in terms of social reproduction, are of crucial concern" (p. 797).

(perhaps only implicitly) an idea of how people are or should be with respect to mathematics. In both two cases a hypothetical account of mathematics as a subject discipline must also consider the actual, potential or ideal subjectivities involved in it. Hence, another related question arises.

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Any approach to this question in turn could not be carried out in isolation from a preliminary understanding of what the disciplinary subject of mathematics is (both at the institutional level and at the level of the actual people involved with it). Thus, the former question concerning mathematics as a subject discipline appears to be complexly related and inextricably intertwined to the latter concerning the subjects (ideally or actually) involved in the discipline. Investigating the subject of mathematics, understood in this double sense and with particular reference to meaning, was the main objective of the thesis.

Indeed, the thesis amounts to a sociological study of mathematics as a subject discipline having at its center Max Weber's notion of meaning. As anticipated, the thesis investigates the institutional and social discourses articulating the meaning associated to mathematics as a subject discipline as well as how such meaning is in turn related to the enactment of the discipline itself by (actual or ideal) subjects. The exploration is conducted in two complementary directions epitomized by the two senses in which the title of the thesis can be understood (and connected to Michel Foucault's dual notion of "governmentality"). On the one hand, the thesis investigates how mathematics' meaning and subjectivity are articulated within Italian and supranational institutional documents and, in connection to these, the thesis further discusses the current paradigmatic direction of mathematical instruction. On the other hand, the thesis explores how university students in mathematics preparing to become teachers in Italy articulate their process of subject-constitution with respect to mathematics as well as how they reflect on selected mathematical word problems. The general purpose of the thesis is to furnish a descriptive sociological account which relates the micro level of subjective agency with the macro level of structural reproduction of mathematics as a subject discipline in institutions.

References

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