

Theories of Mathematics Education: Origins and Perspectives for Their Development

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Essentially, there are two institutional settings which gave rise to the emergence of theories on mathematics teaching and learning: teacher training for secondary schools and teacher training for primary schools. While the latter setting in many countries were organized in the form of normal schools and enhanced focus on teaching methods and on considering aspects from psychology and pedagogy, the first setting basically provided by universities focused on content knowledge and without regard to the psychological and pedagogical dimensions of learning mathematics. It was within the settings of normal schools that empirical research on learning mathematics performed by psychologists was first accepted for use in teacher training. While this occurred already by the turn of the 19th to the 20th century, further development was quite slow. It was largely due to social movements, which effected the breaking away of social barriers between the separate systems of primary and secondary schooling mainly since the 1960's. It enabled the creating of professorship for mathematics education at the level of higher education, with the impact of initiating research into mathematics learning and teaching.

In the wake of the Royaumont Seminar, organized in 1959 by the OECD, institutes for research into the learning and teaching of mathematics were created in various countries. Eventually, professorships for mathematics education were established within higher education, thus facilitating research in a more extended manner. Most notably, the work of the net of 25 IREM in France, launching several theories with international impact, like *théorie des situations didactiques* and *théorie d'anthropologie didactique*. Yet, today there is not one single general theoretical framework, but a variety of different ones. Michèle Artigue has therefore developed the conception of "theory networking". Given that the variety of theoretical approaches is largely due to differing national contexts and the problems of mathematics teaching, the perspectives for future development will be in interrelating those aspects of mathematics education, which provide the best adapted intersections, if such exist.