

SEMIOSPHERE LENS FOR MATHEMATICS TEACHER EDUCATION

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In Italy, there are no compulsory contents or practices for mathematics teachers' professional development. The results of the 2018 OECD Teaching and Learning International Survey, which aims at examining the level of professionalism in teaching, show that teachers' education have a positive impact, a change, on teaching practice. However, "prescription does not motivate all teachers to change their practices, [...] providing only a body of knowledge might leave some teachers not knowing what direction they should take to enact changes" ([1], p.2). Furthermore,

1. only 44% of teachers affirm to participate in training based on networking, even if they also report that professional development based on collaboration and collaborative approaches to teaching is among the most impactful for them;
2. around half of teachers and principals report that their participation in the professional development available to them is restricted by scheduling conflicts and lack of incentives;
3. changes in teaching and learning practices "are a challenge", due to the fact that we are dealing with cultural, psychological, pedagogical ([3], p. 230) and disciplinary issues.

Universities and researchers are responsible for addressing such issues and proposing appropriate measures. Scholars provide the epistemological legitimacy of the taught knowledge. Indeed, any human activity "has its own scholars, held 'to know best' than the rest of the people in the little world where they belong" ([4], p. 76). This is particularly pronounced in the Italian academic tradition where general pedagogy aspects are traditionally separated from problems of teaching science and mathematics. Knowing mathematics is different from knowing how to teach mathematics. There is a need for sustainable mathematics teacher education, but also for research into cultural and social aspects to enable mathematics teachers' critical reflection.

I address the issue using Lotman[5]'s Semiosphere lens. My study is based on a semiotic-cultural analysis of data, collected during Lesson Study experiences in mathematics [2], i.e. a Chinese teacher professional development methodology that can trigger a critical reflection. If observed through the theoretical lens of Cultural Transposition [6], Lesson Study as a foreign methodology questions teaching intentionalities of Italian mathematics teachers. The analysis of two experiences carried out respectively with grade 5 and grade 12 students, in the area of calculus of probability, are paradigmatic for this study and demonstrate the essential activation of reflective practices around the mathematical concept itself as well as teaching practice.

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