



Introduction to the Special Issue on Development of Research Competencies in Mathematics Education

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Published online: 2 April 2018

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Our practices in doctoral education are a combination of longstanding traditions, replications of how we ourselves were trained, administrative convenience, and profound inertia. We do not subject our programs to the kinds of experimental, skeptical, adventurous innovations and tests that we claim to value in our scholarly work (Shulman 2010, p. 9).

Dedicating a Special Issue in a scholarly journal to the development of research competencies in mathematics education cannot be taken for granted. Some readers might immediately question whether this topic is something that our mathematics education community should be *really* concerned with. Indeed, browsing through the research outputs of the community as a whole (e.g., journals, publications, conference websites, and university programs) quickly reveals that our collective research competencies are probably better than they have ever been before. Other readers may justly note that the topic of research competencies fits more naturally under the umbrella of higher education studies. While the publication of the Issue in *CJSMTE* evidences that these critical opinions are not shared by everybody, we consider criticism as a valuable way to engage with the topic. Furthermore, we feel that providing some answers to the possible criticism is necessary for laying the groundwork that the papers in this Issue deserve.

As a young discipline that still searches for its identity (e.g., Fried and Dreyfus 2014), mathematics education systematically expands its foci of interest, sharpens its research methods, and progresses in epistemological understandings of its own doings. These welcome trends can be associated with a maturation of our discipline. The views on the maturation rate can vary significantly, yet it is hard to deny the prolificacy of ideas and contributions that are offered almost on a daily basis. In many cases, these ideas and contributions exceed their antecedents in their sophistication and incommensurability with each other. The situation is especially challenging for the newcomers, who are required to make sense of the disciplinary prolificacy in the past and present (without figuring out yet) the often unarticulated rules that the discipline abides. In this

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situation, a disciplinary expectation for offering new understandings to a rapidly developing body of knowledge is an especially high bar to reach. Hence, we hope that the readers will agree that an integration of newcomers into our research community has become more challenging than ever.

It is true that the above argument is valid for other research communities as well, but let us consider it as part of a complicated conglomerate of challenges and affordances that shape each discipline. For instance, our discipline was given birth by one of the most ancient fields. What was born, however, was essentially a firm belief that it is valuable to look at mathematics learning (and later, teaching) with an eye that retrospectively can be called a disciplined inquiry (e.g., Cronbach and Suppes 1969). (In our perspective, the debate on how this inquiry should look in the particular case is still ongoing.) In this way, the research and practice counterparts are tightly entangled in mathematics education, when the latter is way more entrenched than the former. What is the relevance of this historical retreat to the integration of newcomers into research? More often than not, our newcomers arrive from other disciplinary traditions and/or with a significant pedagogical experience, not to forget their personal longitudinal journeys as mathematics learners. Clearly, studies in higher education can offer valuable insights for developing newcomers. Yet, not every research community has been blessed with such resourceful and diverse newcomers as ours! Then, we argue that there is a strategic need for developing discipline-specific understandings of how research competencies of *our* newcomers can be developed in a way that benefits the mathematics education enterprise in its broadest sense. Echoing Shulman (2010), we propose that these understandings should be research and practice-driven to meet the refined quality standards that we value in our scholarly work.

This Special Issue comes as a logical consequence of the ongoing discourse on the preparation of mathematics education researchers. Through courses, supervision, and mentoring, the discourse has traditionally been part of daily academic practices (e.g., Schoenfeld 2008). Yet, in the last two decades, we have witnessed how the discourse “went beyond” departments and faculties to become a collective priority of the international mathematics education community. The priority is enacted through special conferences on doctoral programs (e.g., Association of Mathematics Teachers Education 2001), activities that are designed to bring together young researchers from different countries (e.g., YERME Summer Schools), and “early-career days” that precede many conferences in our discipline these days. The research form of the discourse is still in its conception stage (e.g., Boaler et al. 2003; Kontorovich 2015, 2016; Nardi 2015), and the Special Issue at hand comes to contribute to its further development. Indeed, it is rather paradoxical how under-researched the discourse is, taken into account its ubiquity in our community and the massive number of potential customers of this research knowledge worldwide (e.g., students, supervisors, policy makers, program designers). Hence, we hope that sometime in the near future, the enterprise of teaching and learning mathematics education research will become a focus for theoretical and empirical studies in our community. The six papers in this Issue pave the way for these future studies.

This Issue presents a collection of studies conducted in Canada, Israel, Italy, Turkey, and the USA. While the research traditions and mathematics education communities vary significantly between these countries, the studies can be conveniently divided into three pairs. The first pair comprises the works of Igor Kontorovich and Annette Rouleau and Chiara Andrà and Domenico Brunetto, whose studies explore how newcomers from other disciplinary traditions make their first research steps in mathematics education. Kontorovich and Rouleau concentrate on in-service teachers, who are working towards a master’s degree in mathematics education and are collecting data for their first research project. The study scrutinizes teacher-researchers’ self-reports on situations where they encountered misconceptions and mathematical difficulties of their interviewees. These situations turned out to be exceptionally tense for the teacher-researchers because of what the authors describe as a competition between professional identities of a teacher, who is expected to lend a helping hand to a person in a mathematical need, and of a researcher, who (from the beginners’ perspective) comes to take an “intact” picture of someone’s mathematical understanding.

Andrà and Brunetto concentrate on a beginning doctoral student who comes from mathematics, participates in his first mathematics education conference, and co-writes his first paper with his academic supervisor. The supervisor can also be considered as a beginner since it is her first time to supervise a student

pursuing a doctoral degree. Through exploring the autobiographical narratives of the student and supervisor, the study presents a variety of struggles, tensions, and contradictions experienced by the two. The authors associate this emotional palette with opportunities to reflect and change practices.

In the second pair of studies, Çiğdem Haser and Peter Liljedahl concentrate on graduate mathematics education students and explore their views on becoming independent researchers. The focus of Haser is on the conceptions of doctoral students (with intentions for an academic career) regarding what characterizes an independent researcher in mathematics education and whether they feel as such. In her findings, Haser draws attention to the significant role of the community of peers in shaping individual research experiences and competencies. Interestingly, in some cases, such communities were initiated by the students themselves.

The study of Liljedahl is instigated by an interest in how students change their thinking about research when progressing in their graduate programs. The study offers a detailed account of similarities and differences in the thinking of master's and doctoral students and students at different stages of their studies. Haser's finding on the importance of a community of fellow researchers also emerges in this study. Liljedahl, in turn, emphasizes that this community should not be mistaken for peers working on a research project, but is more of a safety network for sharing experiences with people in a similar situation.

The two last papers of Robert Reys, and Boris Koichu and Alon Pinto, remind us about broader commitments that scholarship in mathematics education entails. Drawing on his four-decade-long supervisory experience and statistical data from the doctoral programs in the USA, Reys shares his vision of an idealized path for becoming a mathematics educator. The path points at knowledge and experiences that are worth pursuing, having in mind that academic research is only one of the career options that become open for students upon the completion of doctoral studies.

For Koichu and Pinto, graduate studies are not the only way for developing research competencies among mathematics educators. Their paper introduces a visionary theoretical-organizational framework where researchers and in-service teachers establish large-scope partnerships around questions that have a value for both sides. Multiple examples are provided to illustrate the premises and heuristics of the framework, both targeted at designing productive partnerships. The authors argue that research competencies of the teachers can develop alongside their work with the mathematics education researchers.

Readers will quickly realize how diverse the presented studies are, in terms of their approaches, methods and theoretical underpinnings. As editors, we believe that such a diversity is necessary when embarking on a complex phenomenon. Indeed, each one of the studies and this Special Issue as a whole peremptorily point at the complexity of the topic with which we deal. We hope that this complexity will be appreciated by the readers. Another hope of ours is that the readers will discern ideas that have some value for them not only from the research but also from the practical perspective. In light of the massive wave of retirements and, unfortunately, the passing of founding mothers and fathers of our discipline, its future depends on the research competencies of current newbies and generations to come.

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