Teachers' immersion in mathematical practices and their teaching practices

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While agreeing with Zazkis's (2008) commentary on the interest and mathematical richness of having teachers live or be immersed in a genuine mathematical practice (resembling a mathematician's practice in various aspects), we question the perhaps-implicit assumption that this sort of activity opens the gate for teachers to do similar work with their students.

We feel that we need to know more about this relationship, including better ways to characterise and document it. As we all know, assumptions are often tacit - difficult to see, mostly unspoken. And, as research has shown us through the years, sometimes our assumptions - our "it will," "it should," "it must," "if ... then" - are not always as obvious as we think. We are often prompted to nuance them, and this is what research allows and compels us to do.

Research into teachers' practices has shown the complexity inherent in their choices and in ongoing decision making processes, illustrated through the multifaceted dimensions that guide teachers in their practices. These studies talk to the dialectical interaction existing between possibilities and constraints in teachers' practices, as well as teachers' ways of handling these possibilities and constraints (see, *e.g.*, Robert, 2001; Roditi, 2005). Teachers need, for example, to adapt their teaching to programs of studies and textbooks; to make choices regarding how to present content, which exercises and problems to offer students, and the day-to-day organisation of students' work. This practice also calls for taking care of situations "in-the-moment," "on-the-spot" when these (often unpredicted) situations happen in the classroom in relation to content or students' work (see, *e.g.*, Mason & Spence, 1999). This network of mutually influential dimensions *interferes* - if we may use this term - in the enactment of specific teaching practices. Thus, the immersion of teachers in rich teacher education practices focusing on experiencing genuine mathematical practices could lead to, but cannot necessarily guarantee the establishment of, or the opening toward similar practices with their students. There does not seem to be a direct link.

Hence, since many factors can play a role, if there is some restructuring of teachers' practices or the investment of new elements in their practices, it thus appears important to understand why and how this happens: How do these teachers make sense of and interpret the mathematical experiences lived in the teacher education program? How do these experiences resonate for them in their teaching practices? What do (or don't) they integrate in/for their teaching? And why? What are the disconnections and the continuities in relation to what they lived in their teacher education experiences? In short, how do they appropriate these experiences for their own teaching practices? These are fundamental questions to answer, we think, in order to better understand the issues at stake. And knowing more about these matters can help us to adapt and articulate our teacher education practices in relation to teachers' needs and practices. What sorts of mathematical practices could, would or are enhancing the practices teachers make live in their classrooms?

Unless and until we know more, we have to be careful around the assumption that living "mathematically genuine" experiences will change teachers' practices. We believe that these critical questions must be addressed before either attempting to reform teacher education practices or offering recommendations for doing so. And at the same time, we are reminded by Mendick's (2008) commentary that our goal is not necessarily to have teachers reproduce mathematician's practices in their classrooms, but mainly to create mathematically rich environments for students to evolve in. We need to know more, as a community, about how to support teachers in these endeavours. Moreover, insights to these important matters can inform us on the relationship that (can) exist between school mathematics and the mathematics of the mathematicians - the very issue that triggered these lines of questioning and commentaries in the previous issue of FLM.

References

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What's d?

a, b, c, and d are distinct nonzero decimal digits (*i.e.*, each is one of 1, 2, 3, 4, 5, 6, 7, 8, or 9). When we add the three-digit numbers ccc and bdc, the result is the three-digit number aba.

$$\begin{array}{r} c\,c\,c \\ \underline{b\,d\,c} \\ a\,b\,a \end{array}$$

Show that there is only one possibility for d. (posed by Alistair Lachlan; selected by Malgorzata Dubiel)
