Learning in and from Practice: Comments and Reflections

Aline Robert, *IUFM de Versailles, France*

What can I add to such a sum of the quite interesting ideas presented in this strand?

I quite agree with the important points often emphasized in the texts: the importance of taking into account the complexity of the related issues, not only when interpreting research results but also when conceiving a study; the importance (perhaps even the necessity?) of the collective work, whatever it could be, in in-service teachers' development; the importance of the (long) time to make training effective—even if it is implicit in some works; the importance for professional development of taking into account and even mixing actual teachers' practices and knowledge which is not self-sufficient whatever its contents could be. Nothing is missing!

I have particularly appreciated the shrewdness of Chapter 1, maybe even a bit difficult sometimes. The last two questions of Issue 3, under Part C, are particularly interesting, even if no answer can be found in the text; let me add that the glossary is not quite complete (I miss "constructionist", for instance, and do not agree with the complexity definition!). What I retain from Chapter 2 is the (implicit) statement of the necessity of introducing some elements related to the craft in teachers' development, whatever form it takes. Chapter 3 is very clear and the (mathematical) examples are not only very interesting but also necessary—I was waiting for some examples in math to exemplify the general comments! Apart from the classical classifications of knowledge for teachers, the last chapter presents some news trends related to new ways to conceive an access to precise teachers' activities. They are considered as pieces of a specific professional knowledge (for both points of view of researchers and teachers): I particularly appreciate their "full-of-promise" presentation.

Then I go on with my critical effort, putting on my nose my "distrust" glasses...

I wonder first whether the (internal) difficulty for the authors to respect the demand of using the ICMI papers in priority (if not only) does not explain some heterogeneity of the chapters—according to their more or less acceptance of this prerequisite.

In chapter 2 the authors develop all the possible ways of involving teachers in a practice-based development-and particularly on all collective ways, such as community of practices, to realize such an involvement. They insist on the change of training conceptions, moving from the idea of acquisition to the idea of participation for teachers (taken as a metaphor).

R. Even, D.L. Ball (eds.), *The Professional Education and Development of Teachers of Mathematics*, DOI 10.1007/978-0-387-09601-8_19,

It may be explained by noticing that a common feature of all the chapters is the place given to collective work in teachers' development. However, there are some different meanings of this "collective" property, and it is perhaps not sufficient to recognize that some "scenario" may be labelled with this term: it is not sufficient to understand what is "played" in the training nor to ensure further qualities of the training. The difference between lesson studies and case studies, as so well explained in Chapter 3, is a good example.

Let me go on with this important issue. Another point on these "communities of practices" is the following: are we sure that the simple fact of letting teachers work together will permit in overcoming every difficulty? If not and if, as I think, there are issues too complex to be overcome by the mere fact of getting teachers together, what kind of help does someone else have to give and how? It brings me to add some questions on trainers. Some researchers have developed a very interesting point of view, that is, the necessity of a collaboration between teachers and researchers, but is it a necessary and/or sufficient condition for the trainers? The question of the teachers' trainers seems somehow crucial to me, according to the importance given to collective work and to the necessity of good support, which cannot be improvised. This point is perhaps not developed enough in the text.

Some other implicit questions arise immediately when tackling such issues as in-service mathematics teachers' professional development or growth. Let me recall some of them as a means to explain how the different chapters of the second strand deal with them.

First, there are different ways to conceive teachers' growth and training models: one can think of development in terms of changes; another will think in "enriching" terms. Behind this nuance, we find some authors' conceptions of what may be "good" teaching or a "good" teacher, if that exists, and perhaps there is a difference (a gap?) between the two caricatured positions of "you have to do that or that to be a good teacher" or "if you do that as a teacher, then some particular events may occur in the learning of your students". Such variables, tied to trainers' beliefs, may intervene in understanding the development process.

In the same connection, the spreading of materials such as the National Council of Teachers of Mathematics standards may be "taken as shared" by researchers; if not, researchers have to continue studying them thoroughly, for instance, differences between students may lead researchers and then teachers to adapt some of this "advice", and it may have consequences on training programs.

Another difference may emerge from the difference between "change" and "enrich": it is the way that is chosen to start the training and to anchor it to the actual teachers' practices related to practices' theory taken up.

More generally speaking, let us try to adapt Vygotsky's theory of the Zone of Proximal Development (ZPD) to teachers' practice growth. In a simple way, if the training is anchored in teachers' actual practices, we may interpret it as an attempt to draw on these (acquired) practices to reach new ones not too far from the first ones. Pursuing this idea, the intermediate to go on enriching practices may be the organization of some teachers' work on their own precise activities (in Leontiev's sense), with some "metacomment" allowing teachers to enrich their practices. It is

an extension of the use of the classical students' "tasks and activities" to professional development.

Roughly speaking, we can distinguish three kinds of mathematics teachers' activities, which are tied to teacher planning, mainly choices made on content, tasks, and previsions of students' actual working; classroom management, including student enrolment, improvisations, and assessment; and reflections after the sessions, more or less implicitly. Enriching practices may involve engaging teachers in precise activities of each kind and then studying them.

For instance, Delbois' examples in Chapter 4 may be read as a work on teachers' specific activities tied to managements and reflections: it is related to recognition and interpretation of students' mathematical work. The training involves the possibility of thinking (systematically) about this kind of activity and then enhances the ability to relate such interpretation to a more global view of the students' actual failure in the used procedure. It makes the teacher able to intervene more closely with the students' errors according to the individual student's knowledge or lack of knowledge (in a ZPD perspective for students). Delbois lets teachers work as usual and in some way lets them add something to their usual activities, that is, why one can speak of "enriching".

Working on content knowledge, mathematical content knowledge, and pedagogical mathematical knowledge may also give rise to enriched teachers' tasks and activities more related to choice and management, such as "unpacking mathematical ideas" (see Chapter 4). Let me note that it is mainly teachers' work about exercises that researchers trend to "modify", but there are other important teacher activities, such as exposing pieces of knowledge that may be also studied.

There is another implicit question that lends a common feature to all the chapters: the lack of precise (research) proofs when studying training's effects, for instance. Of course it was not the aim of the strand, but maybe some uses of Chapter 1's benchmarks or issues are missing. If recognizing complexity of the issue is another common feature of all these studies, there is a gap between Chapter 1's level of characteristics in the process of developing professional expertise in and from practice and other ones. For instance, the authors could attempt to label some of their works as examples of some of the dyads or questions presented in Chapter 1.

Actually, when addressing the professional teachers' development related to training, this proof question is unavoidable but "impossible to answer". It is related to the fact that teachers' training involves a "three-level" piece of work, with many issues not yet solved for each level: the teachers' training level, including trainers, and training scenarios (models and implementation), the teachers' actual practice level and their relations to the training and the students' learning level, according to teachers' practices. The difficulty of getting proof about the effects of teacher training is related to the more general and well-known difficulty of connecting, for instance, students' learning and teachers' teaching, with all the differences that may occur between classes, students, and so on. However, in our case it is more complicated, as there is a third level. It is then particularly interesting to give some information on how the proofs were obtained.

I have some last questions about the methodology and the (lack of) discussion: my first questions are tied to the collection of the videos: is it so easy to obtain a video with a "problematic learning situation", as in Chapter 3?

More generally, there are questions tied to some precisions, eventually missing.

It is sometimes difficult to know if the word "learning" concerns students' or teachers' learning.

More importantly, I often miss details on the precise unfolding of sessions in learning communities. Who speaks first? Who decides to finish a debate? The fourth issue about kind of questions developed in Chapter 3 is very important in increasing researchers' awareness on the importance of these questions according to the understanding of what may really occur in groups.

At last, in each study there are some limits and also some factors that appear to be variables, related to the number and the range of the studied cases, or to the specificities of the concerned students or teachers, or to the analyzed content, or to the time (length) of the experiment. Although it is always instructive to know them, there are few such nuances or discussions in the chapters. For instance, I wonder whether training needs and constraints are the same for high school and elementary school teachers, who work in different mathematics and pedagogical contexts. Surprisingly, I did not find this variable in the whole strand.

To conclude, if it is possible to add something in the heading, it would be ten lines with the following ideas.

1. The text is a little bit heterogeneous, in accordance with the diversity of the authors' sensibility; it will fit the readers' diversity!
2. According to the present extent of the works, there are some limits and some variables in the research results, tied to the teachers' diversity (see Chapter 1)—further studies have to go on detecting them and completing the range of the research.
3. An extension of the research to mathematics teachers' "tasks and activities" may provide new perspectives, including (and intertwining) different types of knowledge into actual practices (see Chapter 4): the communities of practices become the means to develop such precise professional growth and not an aim in itself (see Chapter 3).