THEORY OF DIDACTICAL SITUATIONS AS A TOOL TO UNDERSTAND AND DEVELOP MATHEMATICS TEACHERS' PRACTICES

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CHRISTINE MANGIANTE-ORSOLA,
MARIE-JEANNE PERRIN-GLORIAN,
HEIDI STRØMSKAG

Purpose of the paper to be clarified

We shall write an introduction (concise but substantial) for the paper and the conclusion will refer to this introduction → 3 issues for this introduction:

1) the purpose of this paper inside the special issue
2) short presentation of some possible uses of TDS in interaction with regular teaching and how we use it in 2 cases (multiplication and geometry)
3) the main differences in the use of TDS between the two contexts (a question on which we shall come back and discuss in conclusion)

The common focus is how TDS on the one hand may help the researcher understand mathematics teaching, and on the other hand may help the teacher develop his/her practice.

Clarify the comparison between the contexts

- *Make more explicit what we learn from comparing these two different contexts about the use of TDS in studying mathematics teaching and teacher development in collaborative contexts (DP)*
- *I see that the purposes of the action in the vignettes are different. Perhaps this could be said earlier … These differences could be brought to the front of the accounts. (BJ)*

In both contexts

- we focus on the students' learning and mathematics teaching development (our use of TDS is close in the two cases).
- the focus is on the design of the situations themselves and their study.
- the notions of TDS are used by researchers to analyze the implementation.

Differences in research questions

Multiplication

- test the theoretical validity of the situation and identify the essential elements about the knowledge
- make concepts of TDS available to teachers in order to give them new tools for design and analysis of situations (tasks – milieus)

Geometry

- test the theoretical validity of the situation and identify the essential elements about the knowledge

+ study the adaptability of situation in regular education taking into account the contributions of the teachers and the prospects of evolution of their practices

- the researcher wonders how the concepts of TDS could help the teacher to make decisions without necessarily using the concepts of TDS explicitly

Different hypothesis in the two cases

- In the case of multiplication, the hypothesis is that design and analysis of a situation (researcher and teacher together) will help the teacher develop her mathematics teaching practice

  → the use of TDS is explicit (for teachers)

- In the case of geometry, the hypothesis is that professional development is done through the implementation, analysis and adaptation of a situation first designed by the researchers

  → the use of TDS is implicit (for teachers).

→ Different organization of the collaboration between researchers and teachers

The link of TDS to other theories in the discussion

- *To relate more to activity theory: common issues, differences. On aimerait voir figurer quelques références comparatives à la AT, centrale dans ce numéro spécial. We should like see some comparisons with AT, which have a very important place in this special issue. (AR)*
- *Les auteures pourraient aussi signaler ce qui ne fait pas consensus entre théories, et notamment indiquer la discussion sur le fait que toute connaissance peut (ou non) être travaillée comme une solution optimale à un problème donné (cf. types de notions). The authors could also indicate what does not reach a consensus between theories, in particular the discussion about the fact that any knowledge can (or not) be worked as an optimal solution on a given problem (cf. kinds of notions) (AR)*

Links to other theories

- The purpose of the paper is to discuss how TDS can be used as a tool to understand and develop mathematics teachers' practices.

  → WHY TDS?

- TDS affords concepts and models that conceptualize the evolution of mathematical knowledge (from informal knowledge to formal, mathematical knowledge) and the teacher's roles in different phases of this evolution.
- The progress of knowledge is governed by the principle that students' interaction with the milieu provides them with feedback, whether their responses are adequate or not with regard to the target knowledge.

Links to other theories?

- Evolution of knowledge can be understood as interaction between students' prior knowledge, everyday concepts AND the knowledge aimed at by the teacher (scientific knowledge) → link to Vygotskian theory (concept development as the result of an interplay between everyday and scientific concepts)?

- TDS provides a fine-grained analysis of the knowledge progress—and what it takes for the teacher in terms of designing a milieu and managing its evolution.