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Using manipulatives for teaching mathematics: how creative are the teachers?

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Challenges

- Using concrete manipulatives in class seems, in itself, **not to be enough to foster learning**. Several instructional factors moderate their benefits, including students' age, teacher's guidance and perceptual richness of the objects (Carbonneau et al., 2013).
- A key point is that the use of a manipulative generates **diverse interpretations** among learners. The link with the intended mathematical knowledge should result from a mediation process conducted by the teacher (Meira, 1998).
- However, it is a challenge for teachers to perceive or exploit this complexity. This produces uses of manipulatives **disconnected from learning**: as motivational tools (Moyer-Packenham, 2001) or as an end in itself (Puchner et al., 2008).

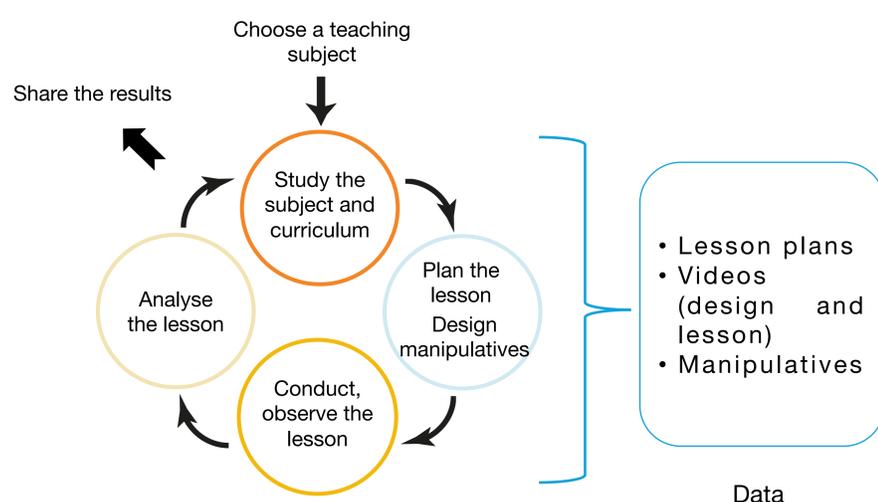
Potential

- Manipulatives can function as **mediation tools** by considering them as symbols embodying mathematical relationships. Fostering individual interpretations and their collective discussion becomes crucial (Nührenbörger & Steinbring, 2008).
- This requires the teacher to:
 - Identify** the personal and mathematical meanings evoked by the use of a manipulative, and
 - connect** these two (Bartolini Bussi & Mariotti, 2008).
- Based on a *Learning by Design* approach (Koehler & Mishra, 2005), we assume that the **collective design of manipulatives** included in a teaching sequence can help teachers integrate manipulatives into their practice.

How does the collaborative design of manipulatives included in a teaching sequence influence teachers' practices?

Digital fabrication

Training project



Training: Lesson Study cycles (Lewis & Hurd, 2011)



2022
Edition



Perspectives

- How to analyse teachers' practices?
- Which teaching-level should be considered (primary, secondary, mixed...)?
- How to facilitate the use of technology for design?

Let us know what you think!



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