

Computational thinking in primary teachers' teaching practice: The contribution of lesson study

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The integration of Computational Thinking (CT) in the teaching of mathematics represents a novel challenge for teachers, as it is a new aspect of the curriculum that requires their professional development. According to Portuguese curriculum documents, CT should be supported by tasks that allow for the simultaneous development of mathematical knowledge and one or more mathematical skills. Despite the recent inclusion of CT in these documents, many educators lack preparation to effectively incorporate these notions into their pedagogical practices. In this sense, my project work addresses this issue by exploring the use of technology in facilitating the integration of CT into mathematics education. Driven by my passion for this field, I aim to tackle the limitations faced by teachers and find effective ways to empower them with the knowledge and tools necessary to implement CT in their teaching effectively (Nordby et al., 2022).

After all, teachers are the main agents responsible for interpreting the curriculum and guiding the development of this transversal capacity in their students. Lesson study (LS) can greatly contribute to the development of the knowledge of primary mathematics teachers about CT, since it is a collaborative teacher education process that occurs in school and promotes reflection on teaching practice (Ni Shuilleabhain & Seery, 2018). Through this investigation, teachers will have the opportunity to try new methodologies and technological tools, as well as to discuss and exchange ideas and experiences with colleagues. Moreover, the group work dynamics and joint reflection about the results obtained will allow the construction of collective knowledge, which may lead to new solutions and enrich teachers' pedagogical practice. In short, lesson study is a valuable context for teacher education and improvement of math-CT learning.

Therefore, the objective of the study is to understand the knowledge development of primary teachers about Computational Thinking in the teaching of mathematics and its integration in their teaching practice during and after lesson study.

This investigation is structured around the following research questions:

1. What is the teachers' knowledge regarding CT and its teaching before and during LS?
2. How does LS supports teachers in the process of integrating CT in their teaching practice of mathematics?
3. What contribution arises from the different phases of LS in developing the teachers' knowledge in relation to CT and its teaching?

The integration of CT into the mathematics curriculum is a topic of growing interest in many countries. Despite limited knowledge of what teachers need to know to effectively integrate CT into their teaching practice, it has been suggested that both teachers' content knowledge and pedagogical

content knowledge are critical factors in their teaching approaches. Specifically, teachers must have an understanding of thinking computationally, as well as the ability to teach CT effectively.

For Ponte (2012), teachers' didactic knowledge is present in all teaching practice, with the knowledge of teaching practice being central to it. Changes in teacher practice depend largely on their conceptions and their understanding of teaching and learning. The LS process provides teachers with an opportunity to reevaluate their views on teaching and to reflect on their practice, which is essential to improve education. It is a context that allows the combination of practical knowledge from teachers and external knowledge from research (Takahashi, 2014), reducing the recurring gap between theory and practice. Therefore, LS can contribute to the professional development of teachers (Ponte et al., 2020) and to the effective implementation of a new mathematics curriculum (Ni Shuilleabhain & Seery, 2018).

In this research, I will adopt a qualitative and interpretive approach and engage the same four primary teachers in two cycles of LS. We will collaboratively study CT, analyse and adapt tasks, anticipate students' work, plan and teach four research lessons. Data will be collected through participant observation, using video and audio recordings of the sessions, semi-structured interviews, and teachers' reflections. Data analysis will be made through content analysis. Ethics will be followed according to the Institute of Education / University of Lisbon and AERA guidelines.

This investigation is just beginning, and no empirical data has been collected yet. I expect that participating teachers will develop their didactical knowledge, including knowledge of the new curriculum, as well as of student learning difficulties. I also expect that the discussion, planning and reflection of tasks will provide knowledge on how to strengthen teachers' conceptions of CT, and enhance their pedagogical strategies.

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