

HÖGSKOLAN VÄST

Practice beyond technology when programming and mathematics teaching converge

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AKADEMISK AVHANDLING

som med tillstånd av Forsknings- och utbildningsnämnden
vid Högskolan Väst, för avläggande av doktorsexamen i Informatik med inriktning
mot AIL, framläggs för offentlig granskning.

Fredag 2 februari 2024 klockan 13.15 i sal F313, Högskolan Väst

Opponent: Professor Anders Mørch, Universitetet i Oslo, Norge

Abstract

Title: Practice beyond technology when programming and mathematics teaching converge

Keywords: Programming; Mathematics; Curriculum; Strategies, Tactics, Michel de Certeau

ISBN: 978-91-89325-64-7 (printed version)
978-91-89325-63-0 (electronic version)

This thesis examines how computer programming and mathematics teaching converge in the presence of a revised mathematics curriculum for upper secondary education. The focus is on the stratified policy strategies deployed by the institutions, how teachers tactically navigated the tensions and contradictions that arose in their everyday teaching, and how these tactics later consolidated in practice. The empirical data for the study consist of interviews with mathematics teachers, unit plans, and other programming activities. The author also examines relevant policy documents, including the mathematics curriculum and the National Exams. By analyzing teachers' tactics and policy strategies, the thesis sheds light on the ways in which teachers adapted to the new curriculum and the challenges they faced in integrating programming into their mathematics instruction. This research aims to contribute to a critical understanding of the complex relationship between curriculum reforms, teachers, and the integration of programming in mathematics education. When mathematics teachers started integrating computer programming into their subject, two tactical approaches became evident: dual teaching and interspersed programming. These two tactics disclose different ontological commitments in relation to the strategies dictated by the curriculum and reflect a cardinal distinction between planning mathematics activities with elements of programming and planning programming activities with elements of mathematics. Over time, teachers' initial tactics were refined, updated, or discarded, yielding consolidated practices in the presence of programming technologies. This transition is characterized by acceptance of new practices rather than acceptance of new technologies. Recognizing these aspects can guide educators and curriculum designers towards a better understanding of the complexities and nuances involved in integrating programming into mathematics education. The results can inform more effective teaching practices and curriculum development that support meaningful integration and promote students' learning in mathematics with the help of programming.