

COMPUTER PROGRAMMING IN THE PROFESSIONAL DEVELOPMENT OF FUTURE MATHEMATICS TEACHERS

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We present part of a 5-year ongoing research (see Mgombelo et al., 2022) where we examine how university students use computer programming as a computational thinking instrument for mathematics inquiry, using a mixed methodology and an iterative design approach. We focus here on some students who are pre-service mathematics teachers and present an analysis on how they use computer programming both for their own learning and for educational resources they create for others. The research takes place at Brock University, where mathematics students as well as future mathematics teachers have the option to take a sequence of three one-semester courses called Mathematics Integrated with Computers and Applications (MICA). In the progression of these courses, students engage in 14 programming-based mathematics investigation projects, including three projects where pre-service teachers may choose to create learning objects (LOs) to teach a mathematics concept. In our larger research, we have been using the instrumental approach to analyse how MICA participants develop programming from an artefact into an instrument (Gueudet & Trouche, 2009) that they can integrate into their practice as mathematicians and teachers; and have analysed their instrumented schemes. Here, using as framework the documentational approach (Gueudet & Trouche, 2009), we focus on how future teachers use programming for their learning and in teaching resources they develop. Data collected include each participant's LO, their associated report, their final projects which are teaching lessons, and semi structured interviews with them. In Mgombelo et al. (2022), we inferred some instrumental schemes that future teachers develop during the development process of an LO. Here, we identify elements of the documentational genesis of future teachers, in how they appropriate programming as a resource, first when they create LO's, and later in their design work for the final teaching lessons.

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References

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