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Designing a digital tool for reasoning with covariation graphs: didactical considerations and classroom experience

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Abstract

The aims of the Interactive Virtual Math-project are to design and develop a digital tool for learning covariation graphs at high school (14-17 years old students) and to explore the use of new technologies for learning in classroom. Research provides some didactical directions to develop instruction that supports the learning of covariational reasoning. For instance, engaging students in the mental activity to visualize a situation and construct relevant quantitative relationships should be prior to determining formulas or graphs. Also, learners can be helped to focus on quantities and generalizations about relationships, connections between situations, and dynamic phenomena. Digital tools can be designed in order to meet these and other didactical requirements. In this talk we present the prototype of such tool: IVM (Interactive Virtua Math) and discuss the didactical principles behind the tool. We use results of a small scale experiment at secondary and tertiary education involving four classes and their students and teachers that used IVM during one lesson to illustrate the working of the tool and the challenges of developing digital didactical tools for learning mathematics. This abstract is submitted to the workgroep didactic considerations with respect to digital tools for the teaching of mathematics