USING ICT TO SUPPORT STUDENTS' LEARNING OF LINEAR FUNCTIONS

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KEYWORDS

Exploratory learning, ICT, Linear functions

SUMMARY

In the poster a case study in a PhD project will be presented, focusing on ICT and linear functions. The study will investigate students' learning on the relation between algebraic and graphical representations of the linear function $y = mx+c$. In particular the parameters. Changes of the scale on the axis also affects the graphical representation. How do the students experience this? Students' conceptions of how parameter values and changes of scale affect the visual representation in a dynamical environment need to be studied more. Students from upper secondary school in Sweden will work in pairs in a laboratory setting. The dynamic computer software GeoGebra will be used and the students will be engaged in two tasks. The students will be video recorded and their activities on the computer screen will be captured.

The two tasks and the research design will be presented in the poster in order to show examples of how to study exploratory learning in an ICT environment.

THEORETICAL BACKGROUND

The role of the parameters is central in this study. In earlier research in connection to ICT one can find that parameters can show the students the differences literal symbols can play and that they can improve their symbol sense (Drijvers, 2003). Drijvers define symbol sense as "the insight into and the structure of algebraic expression and formula" (Drijvers, 2003). "Variation of parameter value acts at a higher level than variation of an "ordinary" variable does; it affects the complete equation" (*ibid p.61*.). One aspect that according to Bardini and Stacey (2006) has not been studied much is students' work with the relation between the parameters *m* and *c* in the standard equation $y=mx+c$ and their graphical representation. In the linear equation *m* and *c* can be considered from different perspectives and *m* is more complex for the students (*ibid*). The *m* value can be seen analytic or visual (Zaslavsky, Sela, & Leron, 2002). From analytic perspective the property does not depend on the representation, but in the visual perspective the slope depend on the scale on the axis (*ibid*).

AIM AND RESEARCH QUESTION

The aim of the study is to investigate students' conceptions of the linear equation in a dynamic software environment.

- How do students' conceptions of the linear equation develop by exploring the parameters and in what way does the dynamical change of scale affect the students' conception of the linear equation in a dynamic software environment?

METHOD

The research will be a case study of eight students, working in pairs, with Geogebra. The students will in the program be provided opportunities to manipulate the parameters and they will get an instant graphical feedback. The students will be asked to create fig. 1 (Magidson, 1992) and fig 2 by writing the equation with different parameter values in the algebraic field. A screen recording program and a video camera will capture the work and stimulated recall interviews will follow the tasks. At the end of the interviews the students will be asked to change the scale on the axis dynamically and explain what happens with the *m*- and *c*-values and why.

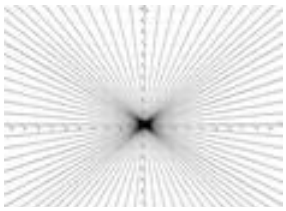

Fig.1

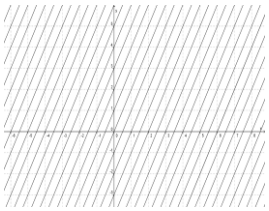

Fig. 2

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