

Institutionen för didaktik och pedagogisk profession

Seeing the parts, understanding the whole

A technology education perspective on
teaching and learning in processes of
analysing and designing programmed
technological solutions

av

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Abstract

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Analysing and designing Programmed Technological Solutions (PTS) has been introduced as a part of technology education in an effort to bring elements of programming into the curriculum for compulsory school, in order to develop pupils' understanding of how PTS work and are controlled by programming. However, what an appropriate understanding entails at this level remains to be articulated, particularly how this understanding looks from a pupil's perspective. Such descriptions are paramount for allowing teachers to make pedagogical decisions on what specifically is to be addressed in the classroom. The challenges are increased by a dependency on programming materials, which give a structure to teaching and learning that is not necessarily in line with pedagogical needs. Therefore, the aim of this thesis is to identify key elements that are important to address in teaching and learning technology in the processes of analysing and designing PTS. The knowledge domain of PTS, in relation to technological literacy, frames the results from three phenomenographic studies that investigate the ways pupils (aged 10-14) experience PTS in the processes of analysing and designing PTS in the contexts of the BBC micro:bit material and PTS from everyday life. The results show that understanding programming concepts and how to produce code are key elements, and most importantly, that there are other key elements embedded in the processes that it is necessary to direct attention to. These are: knowledge related to the dual nature of PTS; knowledge related to the programming material used in the processes; awareness of the relevance structures provided by the contexts in terms of experienced part-whole structure of PTS; and the use of systems thinking to discern the part-whole structure of PTS. Together these direct attention to the structural and functional nature of PTS, which must be understood in order to understand how PTS can be controlled by programming. Thus, these key elements are important to consider in pedagogical practice in order to promote learning with regard to PTS.