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To cite this version:
Annika Grothérus. Formative scaffolding: How to enhance mathematical proficiency, prevent and reduce mathematics anxiety. Konrad Krainer; Nada Vondrova. CERME 9 - Ninth Congress of the European Society for Research in Mathematics Education, Feb 2015, Prague, Czech Republic. pp.1313-1314, Proceedings of the Ninth Congress of the European Society for Research in Mathematics Education. <hal-01287364>

HAL Id: hal-01287364
https://hal.archives-ouvertes.fr/hal-01287364
Submitted on 12 Mar 2016

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Formative scaffolding: How to enhance mathematical proficiency, prevent and reduce mathematics anxiety

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I present the Formative scaffolding approach, a method for teaching, evaluation and assessment in mathematics, describing a study, where 22 upper-secondary social science students’ perceptions and experiences of using formative scaffolding with respect to a test in mathematics are explored. Results indicated that formative scaffolding might reduce mathematics anxiety and enhance mathematical proficiency. Students emphasise the opportunity for a second chance and that the learning process is visualised.

Keywords: Formative assessment, scaffolding, mathematics anxiety, proficiency.

In this poster a method for teaching, evaluation and assessment in mathematics is presented. The method is referred to as the formative scaffolding approach, see Figure 1, in which the concepts of scaffolding (Wood, Bruner, & Ross, 1976), formative assessment (Black & Wiliam, 2009) and writing to learn (Kågesten & Engelbrecht, 2006) are intertwined with each other (Shepard, 2005). Learning comprises cognitive, social, emotional and cultural embedded processes and involves construction of knowledge (Bransford, Brown, & Cocking, 1999; Shepard, 2005). Allowing learners to actively participate in constructing knowledge may provide them with a deeper understanding, more self-confidence and motivation in using their knowledge (Smith, Maclin, Houghton, & Hennessey, 2000). Enabling learners to actively participate in constructing their knowledge and visualize their learning is a fundamental core in formative scaffolding. The overall objective of this study is to present and

**Figure 1:** Overview of the formative scaffolding approach process
describe the teaching, assessment and evaluation method – formative scaffolding, see Figure 1 – and explore twenty-two social science students (age 17–18 years) experiences of the method with respect to mathematical proficiency and anxiety in mathematics. The participants constituted one class in upper secondary school. Through an exploratory action research study we investigated: experiences of formative scaffolding in relation to ordinary test in mathematics; effects of formative scaffolding in relation to mathematical proficiency and mathematics anxiety. Possible limitations in the design of the study was that the class it self was acting as a control group. The present study is to be viewed as a pilot study providing important information about the method as such and how to design a larger future study. Data were collected through short written narratives and one Likert type structured question. Students written responses and indication on the structured question were analysed using thematic coding analysis (Boyatzis, 1998). Emerging themes and illustrative quotes of the students’ experiences is going to be presented. Results indicated that formative scaffolding might reduce mathematics anxiety and enhance mathematical proficiency. Students emphasise the opportunity for a second chance and that the learning process is visualised. We suggest that the proposed formative scaffolding approach may be added to the list of other potential tools for learning, and, this approach can be used to make summative tests in mathematics to an additional opportunity for learning.

REFERENCES


