Student teachers' use of a general analytic rubric when scoring pupils' mathematical problem solving solutions

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This presentation is an on-going research study. The aim of the study is to deepen the understanding of how the scoring of mathematics in student solutions is affected when using a general analytic rubric on an algebraic problem solving task. Especially attention will be paid to how a general analytic rubric contributes to the scoring. The general analytic scoring rubrics are today a popular assessment tool among teachers. Even if there is a lot of research in the area of rubrics there is a lack of research about rubrics used in scoring of mathematics and on the arguments for the scoring. The data consists of recorded discussions, when six student teacher groups scored five pupil solutions. In the analyses of data the focus will be on what is considered in the scoring and what reasons they give for their scoring.

Research question and purpose

The purpose of this study is to investigate how the scoring of mathematics in pupil solutions is affected when using a general analytic rubric on an algebraic problem solving task.

In particular I will address:

    a. What are the bases for the argumentations of the scoring when pupil solutions are discussed and scored?

    b. How are aspects regarding specific algebra difficulties discussed and scored?

The first question (a) is about how the general analytic rubric contributes to the scoring of the pupil solutions and how the rubric is used to score the solution. The second question (b) is about if the specific known algebra difficulties are discussed in the pupil task how are they discussed and scored the difficulties in these cases. Especially interest is if they find any support for their scoring in the general analytic rubric.

The general analytic rubric.

The scoring rubric, which the student teachers used to score the pupil solutions, was a general analytic rubric (Lane, 1993; Meier et al., 2006), with three different aspects, mathematical knowledge, strategic knowledge and explanation. Mathematical knowledge concerns the mathematical accuracy and correctness in the use of terminology in the solution. The strategic knowledge relates to identification of the important parts of the task and discussion of solution methods. Explanation deals with

description of what was done and of why it was done (Meier et al., 2006). The purpose for using Lane's (1993) rubric was because it is a common and often used scoring rubric (Meier et.al, 2006).

Pupils task - Apple

To be able to answer the to research questions an algebraic problem solving task, *Apple*, is chosen. Apple is a released task constructed by PISA (OECD, 2006).

A farmer plants apple trees in a square pattern. In order to protect the apple trees against the wind he plants conifer trees all around the orchard.

Here you see a diagram of this situation where you can see the pattern of apple trees and conifer trees for any number (n) of rows of apple trees:
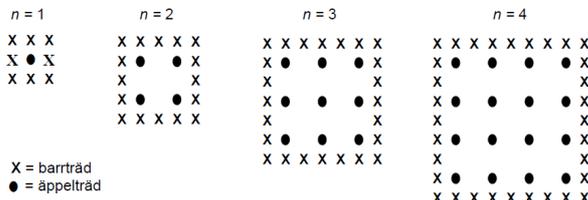
1. Complete the table

n	Number of apple trees	Number of conifer trees
1	1	8
2	4	
3		
4		
5		

2. There are two formulae you can use to calculate the number of apple trees and the number of conifer trees for the pattern describe above;

Number of apple trees = n^2

Number of conifer trees = $8n$

where n is the number of rows of apple trees.

There is a value of n for which the number of apple trees equals the number of conifer trees. Find the value of n and show your method of calculating this.

3. Suppose the farmer wants to make a much larger orchard with many rows of trees. As the farmer makes the orchard bigger, which will increase more quickly: the number of apple trees or the number of conifer trees? Explain how you find your answer.

References

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