

Opportunities and difficulties for students' engagement in PISA Science items

Background

In 2009, a concern to analyze and understand the Swedish students' seemingly decreasing knowledge in Science Education (e.g. Skolverket 2010) resulted in the research project *Perspectives on large scale studies* (PELS). The aim of this project is to conduct quantitative and qualitative re-analyses on the existing data from large scale studies, such as PISA and TIMSS, and to collect alternative or new data related to the studies. As an example of alternative data, we will in this paper, focus on a situation where students in small groups are engaged collaboratively in solving PISA items, in order to approach the students' experiences of PISA.

Purpose

The main rationale of this study is the will to increase the understanding of the results from large scale studies such as PISA through departing from a sociocultural understanding on action and knowledge. The aim of the research reported here is to explicate the problem solving situation, the difficulties and opportunities the students confront within the context of PISA tests. An important point is that the aim here is *not* to assess the students as individuals but instead to focus on *how* the students interact with the items. In this approach human knowledge is not regarded as an individual property but rather as a human action; the action of *knowing* (Wells, 1999). Knowing and human mental processes are seen as *situated* within cultural, historical, social and institutional settings (Säljö, 2000).

Method

In total, 71 Swedish 9th graders from a compulsory school, divided into 21 groups of 2-4 students, participated in our study. All work was audio- and video recorded and the material totally consists of 16 hours of group discussions framed by the PISA items. In all, the students answered eleven questions from three released PISA items (Acid Rain, Green House Effect, and Sunscreen). The groups were asked to have a "think aloud" discussion about how they could solve the problems and then to agree on one common written answer per group. In the phase of the preliminary analysis, the purpose has been to describe how the students interact vis-à-vis the PISA items and what the written answers may represent in relation to this interaction. The data material is scanned for *critical incidents* (Jakobsson, 2001), situations of *exploratory talk* (Barnes, 2008), *gaps of interaction* (Wickman, 2004) and situations of *resistance* (Wertsch, 1998).

Results

Our preliminary results indicate that the students' written answers not only reflect their scientific knowledge, competencies and skills. Their answers also seem to be affected by mostly negative attitudes towards science as it is presented in PISA items, by the lack of familiarity with uncommon words and expressions used in the test, by embedded translation mistakes and by a lack of intersubjectivity between the students and the test constructor concerning what counts as important in an item or even the meaning of it. Further analysis will be conducted in order to validate the results.

Bibliography

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