

LOST IN TRANSLATION? Who is learning from socio-scientific issues?

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BACKGROUND

You cannot open a daily newspaper, listen to news on radio or watch TV without meeting numerous examples of topics which include science. They deal with environmental issues, health issues, etc. Such information is often unstructured and ambiguous and poorly contextualized. It raises the question of how young people can be citizens in a complex world, and what role school science has in helping students develop necessary skills, e.g., ability to critically scrutinize information and to make decisions for their personal and professional lives in the future (Ekborg et al. forthcoming).

Working with socio-scientific issues (SSI) is often said to be a successful way to engage pupils in science and make science relevant outside the school context. Work with SSI presupposes, and possibly will develop, students' competences as problem-solving, information literacy and argumentation. But what pupils does SSI suit? SSI-tasks deal with incomplete information, contain conflicting perspectives and media reports in this field are often biased (Ratcliffe & Grace 2003). This means that pupils need to understand, beside science, the social context to interpret the tasks. They have to be familiar with the public debate (Jarman & McClune 2007)

Pupils from multicultural schools tend to have lower grades in science than the average (Skolverket 2006, Lee & Luykx 2007). Language difficulties is not the only reason for the poor results. Also the feeling of exclusion from the Swedish society helps to explain the pattern (Parszyk 1999, Runfors 2003). This indicates that pupils from multicultural schools should have more difficulties working with SSI than pupils from monocultural schools. They may be lost in translation.

AIM

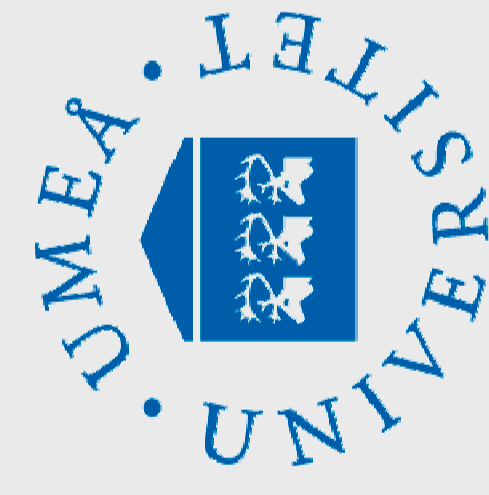
The aim is to compare how pupils from multicultural schools and pupils from monocultural schools experience work with SSI, with focus on scientific citizenship.

METHOD

The context for the study is science lessons at secondary school in Sweden. Pupils (n = 1300) from 70 classes have worked with SSI during at least 5 hours. The data consists of questionnaires answered by pupils after the SSI. In this study schools are defined as either mono- or multicultural schools. The criteria for multicultural school are that at least 30 % of the pupils are entitled to mother tongue tuition. The two cohorts were compared using an analysis of variance (ANOVA) and correlation ratio (eta squared) were calculated.



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RESULTS

Pupils from multicultural schools experience in a higher degree than pupils from monocultural schools that they have learnt and become more interested in science from the work with socio-scientific issues (eta squared 0.01, $p < 0.001$). There are however a few questions where the results show a different pattern. These questions are related to issues of scientific citizenship and awareness of the public debate. The results show that pupils in multicultural schools don't, in the same degree as pupils from monocultural schools, connect school science to an ongoing public debate.

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### The task was about a topical issue

Pupils from multi-cultural schools don't talk about the task as up to date in the same way as pupils from monocultural schools. Despite that the pupils in multicultural schools found the work with SSI interesting. The data otherwise show that the feeling of up-to-dateness is vital for a positive attitude to work with SSI (Ottander & Ekborg 2008).

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We used internet when working with the task

Pupils from multicultural schools use internet in their problemsolving to a lower degree than pupils from mono-cultural schools. Use of internet is strongly connected to if the pupils experience the socio-scientific issue as topical or not. Those who have used internet also consider the issue as topical. When it comes to using newspapers and TV there are no significant difference between the school categories. But, surprisingly considering the nature of the tasks, over 30 % of all pupils have not used TV and newspapers at all.

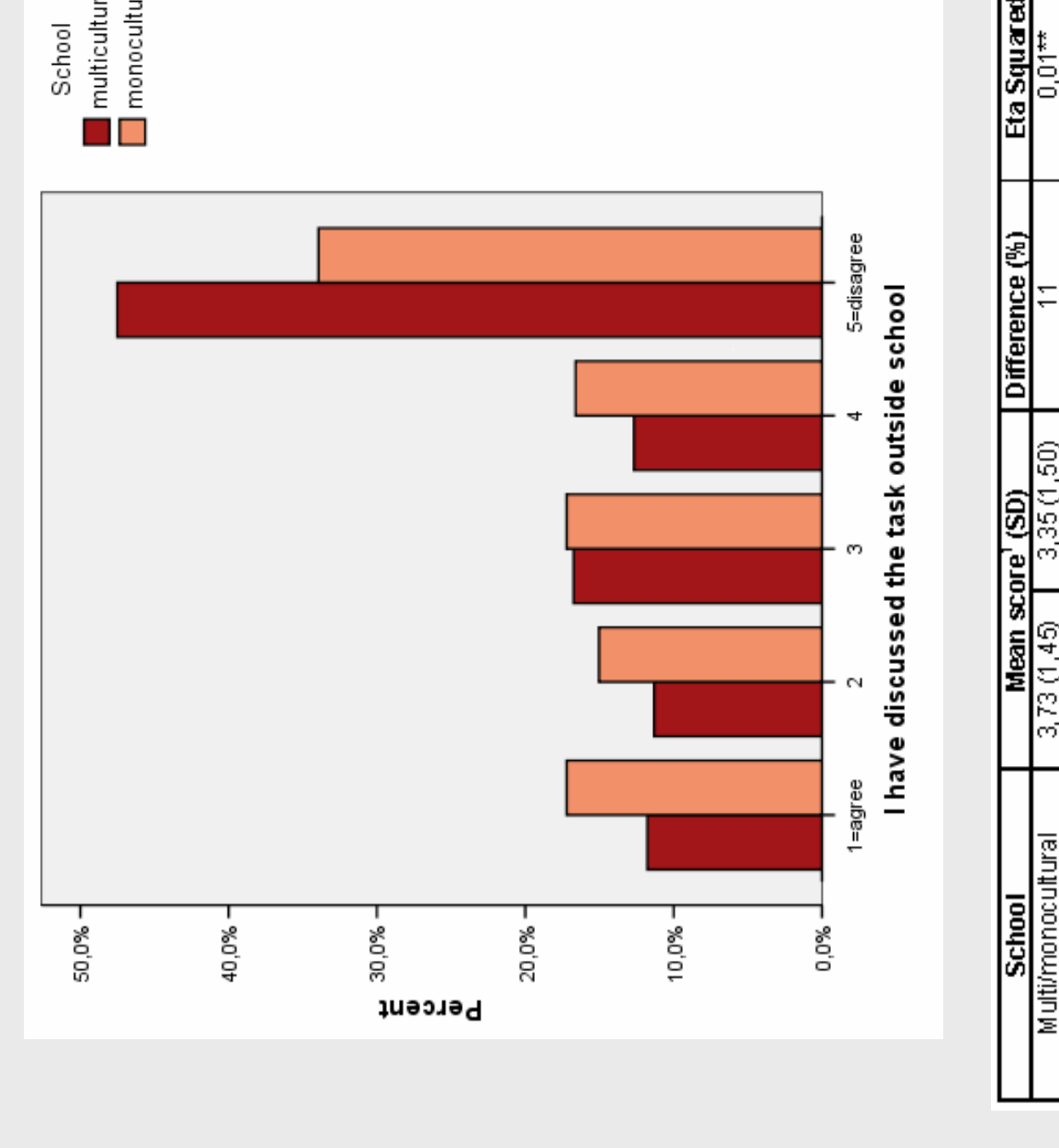
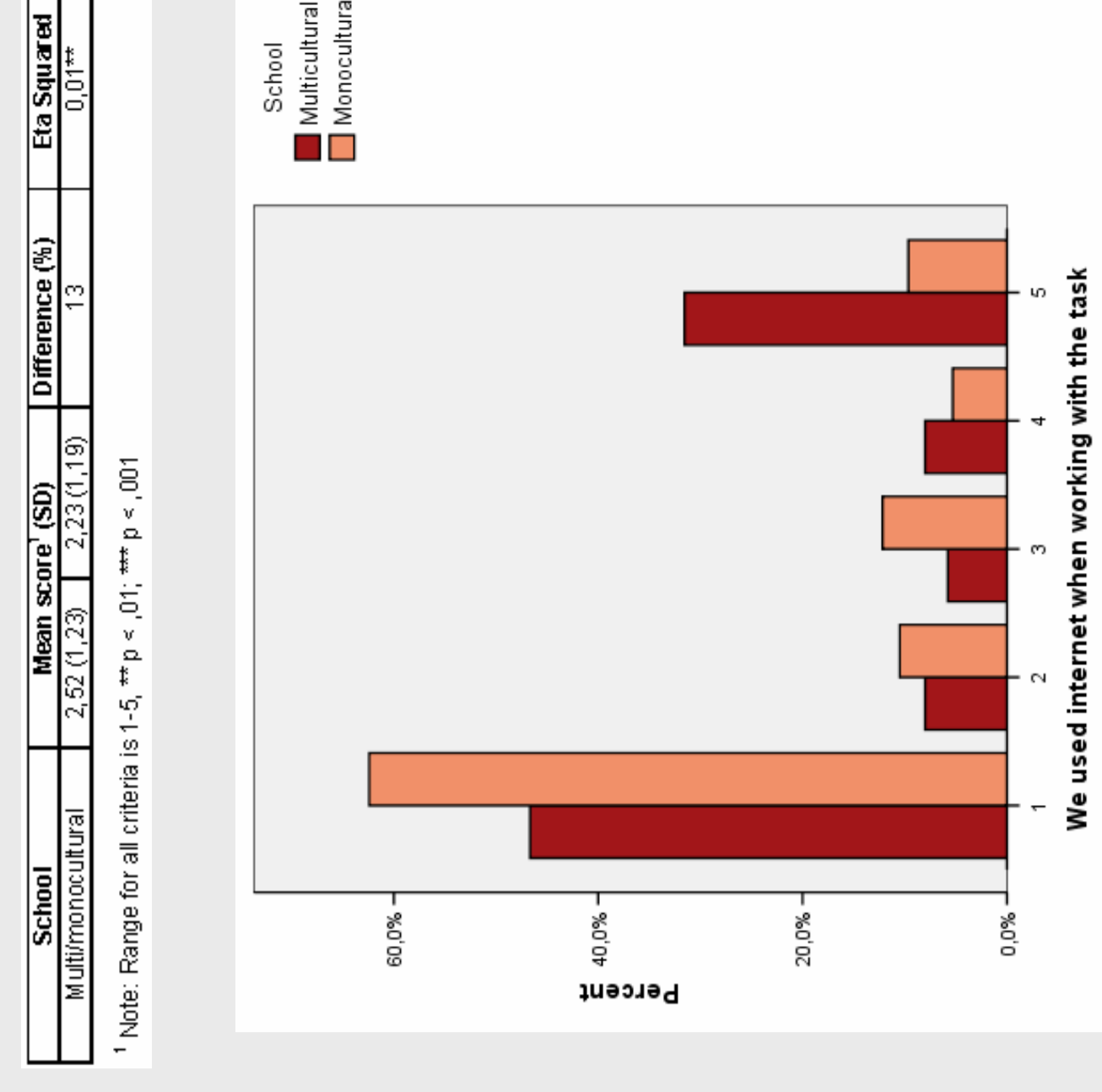
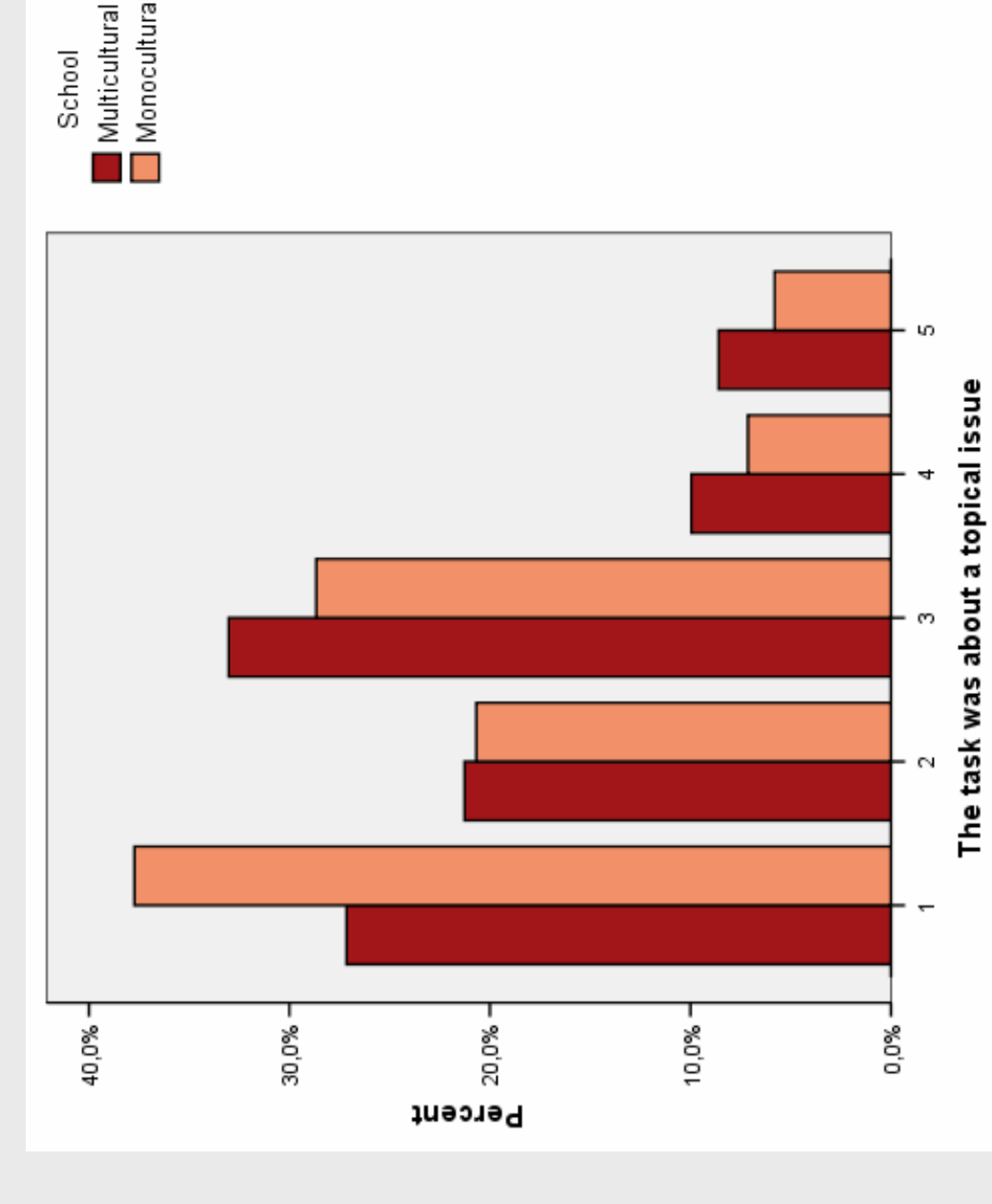
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### I have discussed the task outside school

One third of the pupils say that they have discussed the task outside school. Even if many (50 %) answer that the knowledge they have appropriated in the work with the tasks will be useful outside school, they have not discussed it. School science seems to be something that goes on inside the walls of the school, nothing that concerns friends, parents etc. Pupils from monocultural schools have in a lower degree than those from multicultural schools discussed the task outside school.

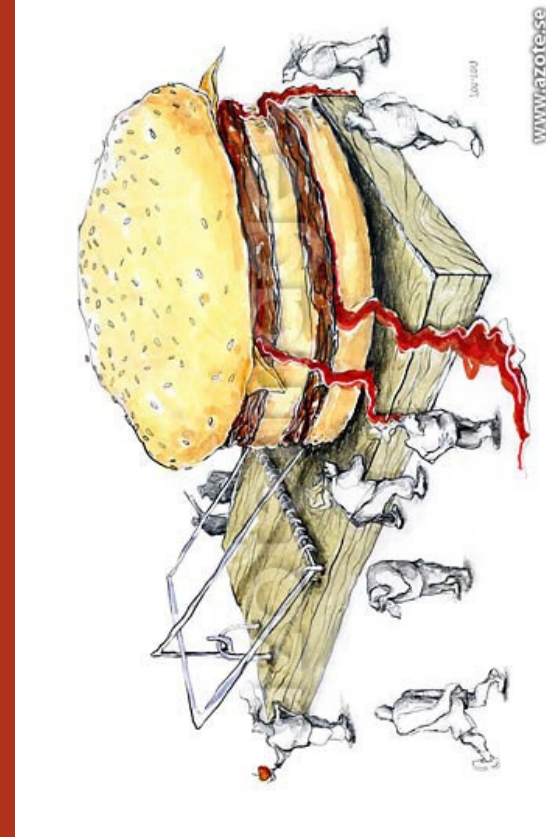
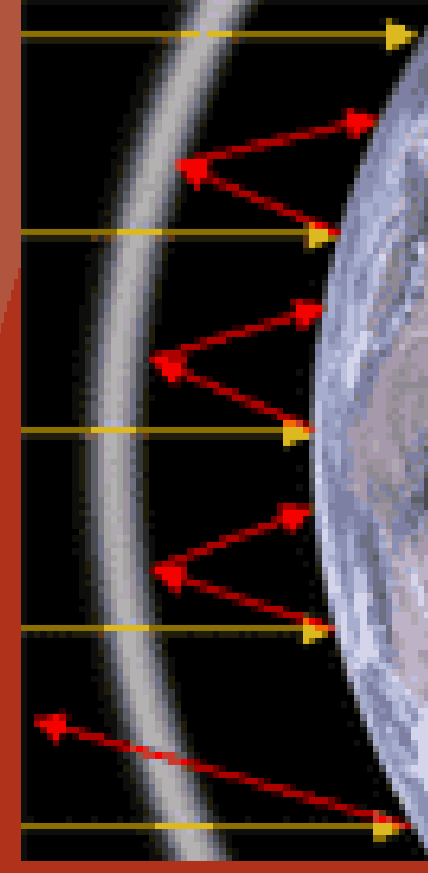
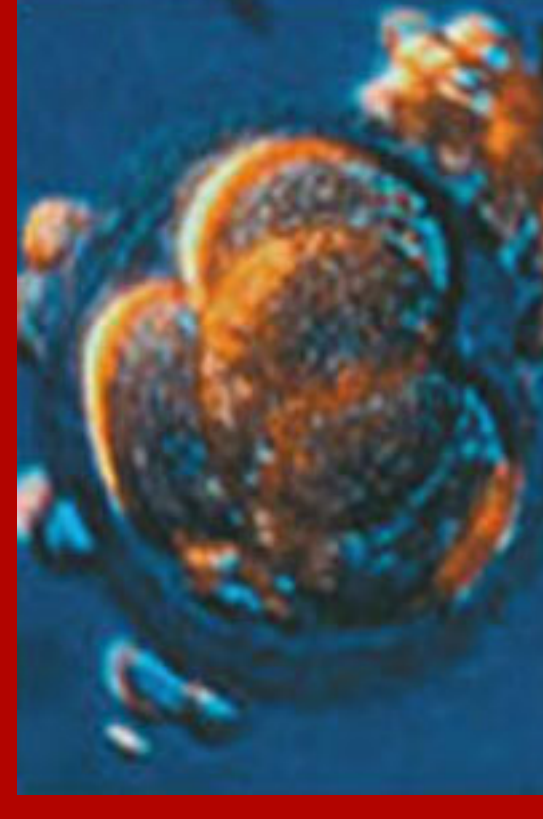
## CONCLUSION AND FURTHER RESEARCH

Earlier studies have questioned if complex tasks as SSI suits pupils from multicultural schools. The pupils in this study express that they learn more and find science more interesting when working with SSI compared with their normal school science. However, they do not relate SSI to the public debate as much as pupils from monocultural schools. It is not possible to say if these results can be explained by social exclusion, language difficulties or media habits. In future research we are going to make a qualitative study on what impacts the intercultural classroom – concerning low SES, cultural diversity, language difficulties, media use and identification with Swedish media debates - can have on the work with SSI. We are also interested in how pupils in multicultural schools use scientific knowledge for decision-making in topical issues, how they can develop citizenship through science education.



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