

## **Social class in Science class**

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Earlier research shows that there is a relation between social class and science education. Many students do not reach the goals for science set by their national curricula and failure in science has been shown to be more strongly correlated to social class than any other school subject. Moreover, success in school science has been shown to act as a gatekeeper to higher education, thus broadening life chances of those who succeed, while limiting the future opportunities of those who fail. Consequently many students from low social class fails in subjects that are constructed as important and highly valued. Science education becomes key factor in the reproduction of an unequal society rather than to contribute to science for all. However, there is little research done regarding how social class is shown and manifested in the science classroom, in the everyday life of the classroom. Thus, the overall aim of this research is to contribute to our understanding of the relation between social class and science class. Data were collected with an ethnographic approach at a Swedish compulsory school during a unit of physics. Results were analysed using concepts from foremost Bourdieu and Bernstein. The results showed that many taken for granted activities and practices in this science classroom reproduced inequalities. For example; a weakly framed laboratory work gave a sense of freedom however reduced the possibilities for those student that could not recognise and realize what to do. The result also showed that it is the form of the content, rather than the content itself that hinder students. This was clearly shown in the dialogues where student with appropriate cultural capital could interact more easily while others struggled with the interpretation. Thus, this research addresses the everyday classroom practices and different pedagogical models in the science classroom.

Keywords: social class, science class, Bourdieu, Bernstein

## **Introduction**

Many students fail in the science subjects and to a greater extent than in any other subjects (SCB, 2011). For example the TIMSS Study (SNAE, 2008) showed that it is underachieving students that mainly contributes to the decreasing levels in science education. Analysis of the PISA study (OECD, 2007) made by e.g. Marks et al (2006) revealed that cultural capital in general and parental education in specific is the most important factor on student results. In Sweden and elsewhere, students from low socioeconomic status (SES) are the ones that are most disadvantaged in school and failure in school in general and in science in particular could therefore be strongly connected to socioeconomic background. In this research SES is linked to the notion social class and it is showed that there is a relation between social class and science education. One of the most obvious consequences is students' lack of basic scientific knowledge needed in decision makings, Lemke (1990) arguing: "a complex society is heading for a disaster when its basic decisions are made solely within the frame of reference of a small elite" (p.138). Moreover, success in school science has been shown to act as a gatekeeper to higher education, broadening life chances of those who succeed, while limiting the future opportunities of those who fail (Calabrese Barton, 1998; Goyette & Mullen, 2006). Consequently many students from low social class fails in subjects that are constructed as highly valued (Nyström, 2009) and in subjects strongly guarded by its sociohistorical legacies (Carlone 2004, Calabrese Barton & Yang, 2000). Science education becomes a key factor in the reproduction of an unequal society (Linder et al, 2007) rather than to contribute to science for all. However, there is little research made regarding how the relation between social class and science education looks like. Consequently we know little about the manifestation of social class in the classroom (Mehan, 1979). The aim of this research is to contribute to a more complex understanding of the relation between social class and science class. The research questions are: (1) How can the relationship between social class and science class be understood and described? (2) How can the manifestation of social class in science class be understood and described?

## **Theoretical background**

In order to elaborate on the research questions this study is informed by theories from sociology of education foremost, Bourdieu and Bernstein. They will be used as theoretical frameworks as well in the analytical process, therefore briefly discussed in this synopsis. The concepts habitus, cultural capital and field provided by Bourdieu are of particular interest in this research (Bourdieu & Passeron, 1990; Bourdieu, 1990; Reay 1995, 2004). *Habitus* could be explained as a "the system of dispositions to a certain practice" (Bourdieu, 1990, p.77). *Habitus* entails a sense of the game or "you could have a feeling in certain practices or places like a 'fish in water'" (Bourdieu & Wacquant, 1992, p.127). However, in school situations, such as laboratory work or in group discussions you might experience the opposite, which could imply a feeling of misunderstanding or alienation. The concept *cultural capital* will be used to understand, for example, which students that are excluded from the science taught in the classrooms and what kind of cultural capital that are valued in the science classroom. *Habitus* and cultural capital need to be understood in their context, the concept of *field* will therefore be used, when elaborating on the science classroom as "a particular sector of that world" (Bourdieu, 1998, p 81). Operationalizing Bourdieu on a micro level, in the classroom, has by some researchers been criticized (Reay, 1995; Sadovnik 1991) claiming that the theory provided by Bourdieu does not help to reveal how the reproduction is happen in concrete social situations. Instead, researchers has suggested that work of Bernstein can provide us with analytical tools for concrete situations and a theory that relates to processes and differences regarding social class. Fundamental in Bernstein's theory is the three message systems; curriculum, pedagogy and evaluation that are realization of this code. When

analysing these three systems Bernstein uses the concepts classification and framing (Bernstein, 1975). Both these concepts points towards power and control rather than content. With *classification* we can analyse power relationships between subjects (such as the hierarchy between science and history) or between scientific knowledge and everyday knowledge, as well as between students. For some students these power relationships are part of their culture and they can easily recognize and understand the culture of the school. *Framing* refers to how the power arrangements are transmitted. Bernstein explains it as “when framing is strong, the transmitter has explicit control over selection, sequence, pacing, criteria and the social base. Where framing is weak, the acquirer has more apparent control over the communication and its social base” (Bernstein, 2000, p 12). How this code are interpreted and understood by the learner could be explained with *realization and recognition rules* (Bernstein, 2000). Morias (1996) argue that the students need to possess recognition rules distinguish what is specific in a given context. To be able to respond and produce what is asked for (hidden or not) you need realization rules. In addition the concepts *regulative and instructional discourse* (Bernstein, 2000) will be used to analyse what kind of discourse e that is present in this classroom and the consequence for the students.

### **Methodology**

With an ethnographic approach data was collected at a compulsory school in Sweden, set in a middle class area in a small town. The students, aged 14 and 15 were followed during a 5 week unit on Physics. The collected data included observations, interviews, and audio recordings. In addition field notes were taken and examples of student work were collected. Besides, student questionnaires similar to the *PISA 2003 Student questionnaire* were completed. The analysis was accomplished in two steps with concepts from Bernstein and Bourdieu as analytical tools. The first step described and analysed the classroom with the concepts classification, framing, recognition and realization rules, regulative and instructional discourse. The second step analysed the students’ background and their actions with the concepts habitus, cultural capital and field as analytical tools. The analytical tools made it possible to elaborate on the students background and how students’ habitus and cultural capital in this particular field interplayed with the teaching, the activities and practices, giving opportunities to understand and describe the relation between social class and science class.

### **Results and conclusions**

The results showed that many taken for granted activities and practices in this science classroom reproduced inequalities. For example; a weakly framed laboratory work gave a sense of freedom however reduced the possibilities for those student that could not recognise and realize what to do. The results also showed that it is the regulative discourse of the content rather than the content itself that hinder students. This was clearly shown in the dialogues where student with appropriate cultural capital could interact more easily while others had problems to recognize and realise the way to talk and act and to translate hidden patterns. Students with cultural capital not valid in this classroom struggled, leaving them confused and misunderstood. These students got strongly influenced by their peers, often from similar background. Other students with appropriate cultural capital were given room to manoeuvre, by their peers and the teacher, giving them better possibilities. Thus, this research addresses the everyday classroom practices and different pedagogical models in the science classroom. In addition this research draw attentions to the understanding of how societal structure influences everyday life in the classroom.

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