Background and rationale[1]

Many students do not reach the goals for science (Physics, Chemistry and Biology) set by their national curricula. Failure in science has by researchers been demonstrated to be more strongly correlated to social class than any other school subject. Foreign background correlates both to school failure and to social class, which makes the situation particularly complex (The Swedish National Agency for Education, 2009a, 2009b; Egelund & Eidesgaard, 2009; Gonzales et al., 2008; Gorard & See, 2009; Goyette & Mullen, 2006; OECD, 2007, Turmo, 2004). 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 (Barton, 1998; Broady & Börjesson, 2008; Goyette & Mullen, 2006). Linder et al. (2007) argue: ”Instead of equipping students to participate thoughtfully with fellow citizens building a democratic, open and just society, school science will be a key factor in the reproduction of an unequal and unjust society” (ibid, p.8) while Tobin et al. (1999) assert that “there is a risk that school science simply maintains the status quo and pushes minorities even further toward the margins” (ibid, p.172). In addition, this study is based on prior research which has shown that both success and failure at school play an important part in reproducing social and economic structures (e.g. Bernstein, 1990; Bourdieu & Passeron, 1977; Willis 1977). Based on this research, my specific research interest concerned in what ways the reproduction of inequalities are shaped in the science classroom.

Theoretical and analytical framework

In this study, theories derived from sociology of education will be used as theoretical framework as well as analytical tools. This paper will briefly discuss the most crucial concepts in the study. *Reproduction* is often strongly connected to ideas regarding class, power, unequal and discriminative social and economic structures in society. According to Bourdieu & Passeron (1977) schools plays and important role in the reproduction which can be seen as a ”transmission of cultural capital cross generations” (ibid, p. ix). In this setting the transmission is considered to maintain social and economic (visible as well as hidden) structures. *Habitus* could be explained as as “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, 1992, p.127). However, the consequences might be that you experience the opposite. In school situations, such as laboratory work or in a group discussion, that could imply a feeling of misunderstanding or alienation. The concept capital can be described as values, assets and resources that you possess as well as shared, improved and converted (e.g. grades). Of particular interest is *cultural capital*, i.e. knowledge and educational qualifications. In the research presented here, cultural capital will be used to understand, for example, what kind of cultural capital that are valued in the science classroom.

The concept classification and framing developed by Bernstein[2] have been used “to analyse the underlying structure of the three message system, curriculum, pedagogy and evaluation, which are realizations of the educational knowledge code” (Bernstein, 1974, p. 366). *Classification* has been described as regulating “what discourse is to be transmitted and its relation to other discourses in a given set (e.g. a curriculum)” (Bernstein, 1996, p.102.). Classification is a useful concept when analyzing “the arrangement of the subjects and the importance they assume in the

[1]This paper briefly describes the research that will form the foundation to the thesis that will be presented 2012.

[2]The work done by Bourdieu and Bernstein can be seen as both complementary and contradictory, more elaborated on in the forthcoming thesis.

timetabling" (Chien & Wallace, 2004, p.2) and why this hierarchy is recognizable by some students while others do not understand the structures of the school. *Framing* "regulates how the discourse is to be transmitted and acquired in the pedagogic context" (Bernstein, 1996, p.102). For example; framing includes the way in which it is legitimated to talk and to act, which give the student the necessary skills to "maneuver around the space of the classroom and the school" (Chien & Wallace, 2004, p.2). Likewise classification, framing can be strong or weak; "[s]trong framing entails reduced options; weak framing entails a range of options" (Bernstein, 1974, p.366).

Based on prior empirical and theoretical research, following overall research questions are applied: How is the reproduction of inequalities shaped in the science classroom and how can this be described and understood in the science classroom?

Method

The research was collected at two Swedish compulsory schools. A first study was carried out 2006, data were collected during science lessons with students aged 13 and 14 (year 7). The students were followed during 2 ½ months including units of Biology and Chemistry. A second round of data was collected 2010, the students, aged 14 and 15 were followed during a 5 week unit on Physics. The data sources were derived from observations, interviews, video and audio recordings (Patton, 1990). The collected data also included field notes and examples of student work. Besides, student questionnaires similar to the *PISA 2003 Student questionnaire* were collected. Thus, the data consist of a number of observations and recordings from such as laboratory work, instructions, assessments and group discussions. Moreover, the data that now are processed contains e.g. information regarding the students, their homes and families.

When working with the collected data, the above stated concepts will be used trying to understand how reproduction of inequalities is shaped in school science classroom. The first step of the analysis will illuminate how the teaching is organized and presented in these specific classrooms (regarding e.g. curriculum, pedagogy, evaluation) using foremost the concepts classification and framing. Following this, an analysis of the student's reactions to the way science education is organized and presented, applying e.g. the concept cultural capital. In the final step the student's background (foremost socioeconomic) will be taken into account analyzed through the concept cultural capital and habitus.

Preliminary findings, conclusions and possible implication

The research presented here is in progress, however, the first preliminary analysis indicates that some students seem to have the capability to understand what is happening, while others struggling to translate and interpret what are expected to happen. For example; when framing is weak, student with inappropriate cultural capital fails. In addition, the first initial results indicates that habitus play a role in the science classroom and influence how students react and respond to the way the teaching is organized and presented.

This preliminary results indicates that science education contribute to an unequal society through the way science is taught and learned in the science classroom. Moreover, the findings indicate that previous research made by e.g. Tobin et al (1999) still is relevant and necessary and calls for attention to issues regarding equity and citizenship in the science classroom.

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