

PEDAGOGIC IDENTITIES IN THE REFORM OF SCHOOL MATHEMATICS

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This paper begins with an interpretation of Bernstein's concept of pedagogic identity, which Bernstein himself describes as "no more than a sketch, no more than an embryonic outline, rather than a completed painting ready to be signed and framed" (2000, p.65). In the second part of the paper, after a short description of the Swedish school system, the current reform and the efforts to improve mathematics teaching and students' achievement are analysed. The theoretical framework is based on the concept of pedagogic identity, showing different groups and institutions struggling to turn their bias and focus into state policy and practice. It is a first attempt to explore the diverse and manifold enterprise of the mathematics reform in Sweden in order to understand the positions and oppositions within the official pedagogic arena of reform.

INTRODUCTION

In a sense, educational change proposals resemble political parties. They represent a 'coalition' of interests and projects brought together under a common name at a particular point in time. The more harmonized these separate segments of projects and interests are, the more powerful the social movement behind the party or the educational change (Goodson, 2000, p. 3).

In the second half of the 1990s, the rules for admission into the national programs at the upper-secondary school changed in Sweden. 'Leaving certificates' in the subjects Swedish (or Swedish as a second language), English and Mathematics became necessary requirements. Ever since then the proportion of students who leave compulsory school with no marks in Mathematics has been steady between 6.0 and 7.4 percent. For this (cumulative) group of students, mathematics works as one of the gatekeepers to higher education. This is just one of the reasons behind the national wide initiative concerning mathematics education in school. The initiative, or rather the range of respective initiatives, comprises a mix of incentive, support, resources, accountability and pressure. Some of the initiatives are linked to the current school reform as a whole but some are especially directed to mathematics.

In this paper, I will analyse the current reform efforts regarding school mathematics in Sweden using Bernstein's concept of *pedagogic identity* (Bernstein, 2000). Under conditions of change, the positions and oppositions in the official pedagogic arena project different identities in the struggle for dominance. The concept of pedagogic identities can offer a useful way of looking at state education policies and educational change. This is a first attempt to do so.

THE OFFICIAL PEDAGOGIC ARENA

Official knowledge is “the educational knowledge which the state constructs and distributes in educational institutions” (Bernstein, 2000, p. 65). In different modalities of reform, the bias and focus of the official knowledge construct different pedagogic identities. The struggle between groups to turn their bias and focus into the State policy and practice can in this perspective be seen as the source of curriculum reform. The model of the official arena, in which the struggle takes place, shows four positions (Bernstein, 2000). The positions represent different approaches to regulating and managing change, approaches that are expected to shape the pedagogic identity of teachers and students. In the Bernstein’s model, two of these identities (*retrospective* and *prospective*) are managed by the state and two are generated from local resources. I use a modified model in which the identities can be generated from both centring and local resources.

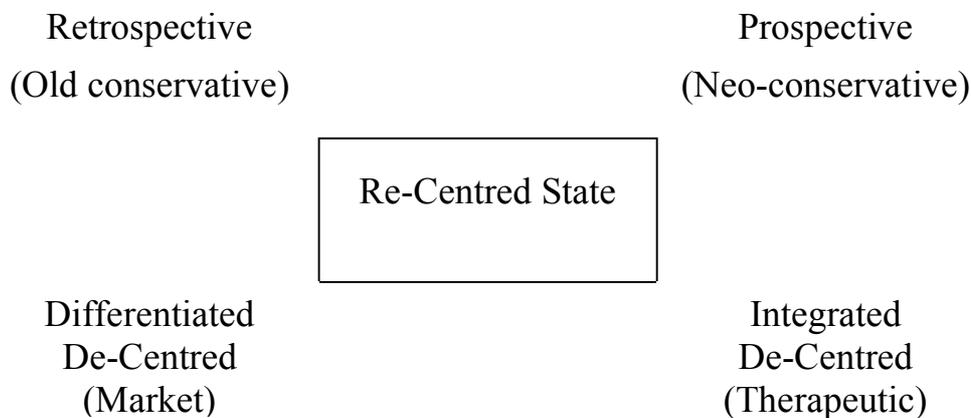


Fig 1: Modelling Pedagogic Identities Classification (Bernstein, 2000, p. 67)

Retrospective identities

The resources that construct retrospective identities are not related to the economy. Retrospective identities are shaped by “grand narratives of the past” (Bernstein, 2000, p. 66) that are suitably recontextualised to stabilise that past and project it into the future. The identities are “formed by hierarchically ordered, strongly bounded, explicitly stratified and sequenced discourses and practices” (p. 67). Revealed by the recontextualised grand narratives of the past, the collective social base is prioritised before individual careers. Retrospective identities are opposed to the de-centred identities since these modes reject past narratives (as the source for criteria, belonging and coherence for the present and future). There are two basic modes of retrospective identities: fundamentalist and elitist. The fundamentalist identity “consumes the self in all its manifestations” (p. 75). Fundamentalists make allowances for and often encourage change. It is entirely opposed to the other mode of retrospective identities, the elitist. Elitist identities can be constructed through education and social networks, apart from the intervention of background. Just like the fundamentalist identities, the position has strong classifications and internal hierarchies, but unlike fundamentalists

it refuses to engage in the market. Elitist identities are perhaps triggered and maintained by “narcissistic formations [...] whereas fundamentalist identities are maintained by strong super-ego formations and communalised selves” (p. 75-76).

Prospective identities

Similar to the retrospective identities, prospective identities are formed from the past. It is however not the same past. The discursive base has a different focus and bias since these identities are constructed to deal with cultural, economic and technological change. Prospective identities are shaped by selected features of the past which are recontextualised to defend or raise economic performance. The position in the official pedagogic arena is solid but the players can change. These identities are essentially future oriented. The narrative resources that they rest upon ground the identities in the future, not in the past as for retrospective identities. Prospective identities involve a re-centring since the narratives create a new basis for social relations, for solidarities and for opposition.

Differentiated de-centred identities (market)

The de-centred market is recognised as an identity projected from positions in the official arena. Local units, groups or departments are monitored by the management in terms of their effectiveness in satisfying and creating local markets. The market demands create a culture and context to facilitate the survival of the fittest. The messages that arise produce an identity whose products are valued by a market. “The transmission here views knowledge as money. And like money it should flow easily to where demand calls” (Bernstein, 2000, p. 69). One can say that these identities are reflections of external contingencies; they are likely to be formed through mechanisms of projection rather than introjection. The position “constructs an outwardly responsive identity rather than one driven by inner dedication” (ibid.).

The focus is in the short term rather than long term, on the extrinsic rather than the intrinsic, upon the exploration of vocational applications rather than upon exploration of knowledge (Bernstein, 2000, p. 69)

The capacity to project discursive practices themselves, which fit the external contingencies, is crucial for the maintenance of this identity.

Integrated de-centred identities (therapeutic)

The integrated de-centred identities are produced through introjection. Bernstein (2000) calls these identities ‘therapeutic’ because they are “produced by complex theories of personal, cognitive and social development, often labelled progressive” (p. 68). Autonomy is necessary for such an identity since it constructs its own characteristics: “an integrated modality of knowing and a participating, co-operative modality of social relation” (p. 68). Non-specialised, flexible thinking, team work and active participation are favoured by therapeutic identities. Their construction is internally regulated and relatively independent of external consumers’ signifiers. Power is disguised by communication networks and interpersonal relations. The

maintenance of this identity depends upon internal sense making procedures. If these fail then a shift to other resources is likely. Therapeutic identities may shift to prospective (Bernstein, 2000).

THE SCHOOL MATHEMATICS REFORM IN SWEDEN: A CASE STUDY

The school system and the curriculum

The public school in Sweden includes both compulsory and non-compulsory schooling. The non-compulsory preschool is for children aged 1-5 years. When children turn 6, they are offered a place in the preschool class and the schooling becomes free of charge (this remains throughout the whole public school system). For all children aged 7-16, attendance at school is compulsory. The upper secondary school, 'gymnasium', is not compulsory but almost all students continue their studies at upper secondary level.

In the middle of the 90s the school system in Sweden changed from rule-regulated to goal-based. The goals are defined by the state but the responsibility for achieving the goals lies on the municipalities (the local educational authority) and the local school (principal and teachers). Steering documents are drawn up at different levels within the school system. It is the Government and the Parliament that specify goals and guidelines for preschool and school. The overall national goals are described in *The Education Act*, the curriculum and course syllabi for each school subject. The central administrative authority, the National Agency for Education (Skolverket), steers, supports and evaluates the municipalities' management of the schools. The task of the Agency is to work actively for the achievement of the goals and to ensure that all children have access to equal education. When the authority for school development was decommissioned in 2008 (it had been established by the former Government in 2003), some of their tasks was passed on to the Agency. A new authority was simultaneously appointed, the Schools Inspectorate. This supervises local authorities to ensure that those who are responsible for the schools follow the laws and regulations. One of the first tasks of the Inspectorate was to carry out an evaluation of the teaching of mathematics.

When the school system changed and became goal-based, a new kind of curriculum for compulsory school was required. The current curriculum, Lpo 94, differs from its predecessors in many ways. One obvious difference is the number of pages. The current curriculum consists of 20 pages (not even 10 percent as much as the previous one). The focus is on principles and normative values that should permeate the schoolwork. There are no instructions concerning teaching methods; how to reach the goals is locally determined. The mode of the 'new' curriculum makes it hard to compare with its predecessors. Nevertheless, the syllabus of mathematics includes a 'new' perspective; students are supposed to learn not only mathematics but also about mathematics (Johansson, 2006). In the syllabus for compulsory school, this aim is expressed in the following way:

Mathematics is an important part of our culture and the education should give pupils an insight into the subject's historical development, its importance and role in our society. The subject aims at developing the pupil's interest in mathematics, as well as creating opportunities for communicating in mathematical language and expressions. It should also give pupils the opportunity to discover aesthetic values in mathematical patterns, forms and relationships, as well as experience satisfaction and joy in understanding and solving problems (Swedish National Agency of Education, 2009, p. 23).

A rule that was implemented when the school system changed in the middle of the 1990s is that students need to have 'leaving certificates' in Mathematics, Swedish (or Swedish as a second language) and English in order to be qualified for the three-year national programs. An alternative for the students that fail in one or more of these subjects, if they would like to continue their studies, is to attend an individual program. The program offers a personalised study plan for the individual student. Each year since the reform, nearly ten percent of students have not qualified for the national programs when they leave compulsory school. About seven percent of students do not pass in mathematics. The situation is described as unacceptable in the political rhetoric. A new reform of the upper secondary school suggests that the current model of individual programs will be replaced by other alternatives.

Improving mathematics teaching and students' achievement

The election of a new Government in Sweden in 2006, a shift to the right, can be seen as the starting point for the current comprehensive school reform. The school was however already 'pathologised'. A lot of attention was given to, for example, students' results in mathematics on the national tests and final grading, the programs and the syllabuses at the upper secondary and the individual program. In 2003, the previous Government had decided to set up a Mathematics Delegation whose task was to propose measures to strengthen mathematics and its teaching. The current reform effort in mathematics education could (to some extent) be seen as a result of the proposal from that committee (Matematikdelegationen, 2004). Further 'triggers' are the results from national and international evaluations (e.g. Skolverket, 2003; 2004; 2007a; 2007b; 2008). So, this is the background for giving priority to mathematics and this is how the Government (the minister of education) motivates it:

National as well as international evaluations in recent years indicate that Swedish students have weakened their knowledge in mathematics and science. The international evaluation TIMSS 2007 shows clearly declined results compared with the evaluations from 1995 and 2003. The Government takes the situation seriously. The future of the competitiveness of Swedish industry depends on young peoples' interest in and good knowledge of mathematics, science and technology (excerpt from the commission from the Government to the National Agency of Education, (U2009/914/G), p. 5, author's translation)

Throughout the financial year 2009, the National Agency of Education is commissioned by the Government to perform the following tasks:

- through an application procedure, distribute 87 million (about 8 million Euro) Swedish kronor to mathematics development projects in schools,
- produce support material and disseminate information (about mathematics),
- analyse and suggest inputs that can facilitate the transition from gymnasium to higher education in the field of mathematics, science and technology,
- distribute funds to Science Centres.

Apart from the mixture of initiatives directed towards mathematics, the current school reform has additional consequences for mathematics as a school subject. Some of the changes already implemented are: a) goals and national assessments in school year 3 (previous only for year 5 and 9); b) written assessments in all subjects and every school year (marks were previous only given to students at grade 8 and 9); c) training in mathematics at the upper secondary school gives extra credits when students apply for higher education; d) an experimental work with elite upper secondary schools has started in three places in the country. The students are recruited from all over Sweden. Furthermore, a new curriculum and new syllabuses for compulsory school will be implemented in 2011.

The Read-Write-Count-Project (year 2008-2010) offers a directed State subsidy which the municipalities can apply for. It is a non-compulsory commitment for which the local authorities have to follow rules from the Government in order to get the subsidy. The financial support is distributed by the Agency. It can be used for increasing the workforce and the competence of teachers but it can also be used for curriculum material. The official aim of this project is to improve the work as regards students' basic skills. The focus is on early testing and diagnosis and the objective is to increase the students' goal-attainments.

Through an application procedure, schools can get financial support from the Agency for development projects in mathematics. Three types of project can be granted: projects that aim to develop teaching methods; pedagogical developmental work; and further studies in mathematics. The schools can decide which type of project (more than one type is allowed); the Agency divides the money between the three parts. The number of students involved defines the size of the subsidy. Selected projects are financed with 3 000 SEK (about 280 Euro) per student.

Mathematics is also prioritised within the state initiatives *Läraryftet* and *Förskolelyftet*. These programmes entail in-service training for qualified, in-service teachers and pre-school teachers. The teachers can study full-time with a 20 percent reduction in salary. They can choose from a range of courses at colleges and universities that are approved and procured by the Agency. Continuing education for pre-school teachers is mainly directed towards language and mathematical development of children. The official standpoint is that:

The continuing education that is commissioned by the Agency shall depart from the priorities and requests from the responsibly authority. Additionally, the Agency shall

prioritise continuing education in areas that have proved to be especially disregarded (resolution by the Government (U2007/3168/S), author's translation).

The state pays the costs for the courses and compensates the schools for part of the payment to the teachers. During spring 2009 there was 2 262 places on courses approved by the Agency, 2 137 teachers applied and 585 requested education in mathematics (this was ten more applicants than the available places). Within the framework for *Lärarlyftet*, teachers can also suggest courses from the regular selections at the colleges/universities. However, these institutions are not allowed to advertise these courses under the same conditions as the approved courses. As a consequence, teachers must be more active (and skilful) when searching for suitable courses.

'Mathematics change agents' (matematikutvecklare) is another initiative. This was started in 2006 and involves financial support to regional and local development projects in mathematics. The National Centre for Mathematics Education, NCM, runs this programme together with the Agency. Regional conferences are arranged and the municipalities can have two participants attending each conference with no conference fee and selected literature for free. NCM reports that 93 percent of the municipalities have used this offer for the eight conferences that have been carried out in the years 2006-2009 (<http://matematikutvecklare.ncm.gu.se/> 2009-08-13).

School development projects are also supported through specially compiled support material, inspiring material and the dissemination of information and experience from previous projects. As an example, NCM is commissioned to produce research-based knowledge overviews. Funds are also given to other institutions, for example to a project for teaching mathematics for multilingual students (Webbmatte) and to the Educational Broadcasting Company, UR, (belonging to the Swedish public service). A further example is the support to develop inspiring material for Sámi School to help teachers to take a Sámi perspective in their teaching of mathematics. The state also gives financial support to a selected number of upper-secondary schools to support cooperation with colleges/universities.

The pedagogic arena: an analysis of the current reform in Sweden

In this part of the paper, I shall use Bernstein's concept of *pedagogic identity* as a framework for analysing the current reform in Sweden. The focus will be on the range of state initiatives concerning mathematics and the institutions that are involved. The assumption is that the institutions are projected into different pedagogic identities. The power or the empowerment of an institution, within the reform, is determined by the state or, indirectly, through other positions in the official pedagogic arena. A reform emerges and develops as a result of the struggle in the arena in which the different pedagogic identities try to turn their bias and focus into State policy and practice.

Retrospective identities could be mathematicians or educationalists who try to protect their view of the subject or their view of schooling. Discipline problems, a lack of

interest in mathematics or school work in general could create the feeling that it was better in the 'old time' – when students were submissive, behaved properly and paid attention in class. For retrospective identities, a reform is positive because it opens up a possibility to claim their view. In the ongoing reform efforts, this position seems to have influence. Two examples are the Read-Write-Count-Project and the in-service training for pre-school teachers; both of which have a focus on basic skills. The development of school mathematics is neglected in favour of maintenance of well-known competences. Further examples are the initiative of elite upper secondary education in mathematics and the extra credits that mathematics gives when students enter higher education. The new syllabus in mathematics, to be implemented in 2011, could perhaps show if this position has a crucial role in the reform.

Prospective identities have to take responsibility for cultural, economical and technical changes. This position is grounded in the past but is supposed to mould the future, without jeopardising the economy. In the current reform, the Government, through the Agency and other institutions, tries to create a 'new' school. It is not about changing the view of what education and schooling is about, but rather an effort to reach anticipated results through a combination of pressure and support. The School Inspectorate supervises the schools so that they follow the rules determined by the Government. Students' results on national tests and final grading are made public on the Agency's website so that parents, students, journalists and others who are interested in a particular school have easy access to these results. Since the economy of the schools depends on the school voucher attached to each student, competition between schools (both independent and public) to attract students has become noticeable. Thus, local school authorities are projected to this position through this combination of pressure and support.

Differentiated de-centred identities (market) have considerable influence in the current reform. This position is projected through the expectations, needs and requests from other pedagogic identities. The most empowered institution in this position is the Agency. It is a central authority, so one should perhaps see it as a prospective identity. On the other hand, the Agency has some autonomy and works as a player in the market. It produces inspiring materials and research overviews, disseminates information on its website, and so on. The Agency chooses affiliates; the chosen institute (or person) will be empowered and influence the reform. In the current reform, the main 'co-drivers' and 'performers' are the colleges, the universities and the national resource centres (for example NCM). These institutions are 'co-drivers' and 'performers' in the sense that they could give support and advice to the authorities, which in the next phase could commission them to act in the suggested direction. In some sense, these institutions have to compete with each other to get their share in the official pedagogic arena.

The positions and oppositions are made visible through, for example, the choice of college/university courses within the programmes *Läraryftet* and *Förskolelyftet*. Without approval from the Agency, an institution will not be on the list of eligible

courses and thus not get the same chance to influence teachers working in the schools or the pre-schools. In addition, the Agency creates a discourse about the teaching of mathematics through the selection of courses. 'Outdoor mathematics' and 'laboratory mathematics' seem to be adequate approaches as well as 'the foundation of mathematics'. The criteria for approving the various kinds of courses are mostly of organisational type. A scientifically based approach is not explicitly asked for.

Integrated de-centred identities are recognised by their way of building communicative networks and social relations. Students' associations, mathematics teachers' associations and the network of 'mathematics change agents' could belong to this position. Their role in the current reform is vague but one can assume that these identities have a rather weak position. The school is pathologised; the 'remedy' is to improve teachers' knowledge and to encourage students to work harder in (and enjoy) mathematics. The programmes of in-service teacher training and the extra credits for mathematics in upper-secondary school are incentives in two different directions. The freedom to choose courses could be seen as a possibility to empower this position. However, it is still the authorities who choose the range of courses and whom to permit to attend the college/university courses. One could also think that the position could be empowered through the subsidy from the state for developmental work. But even in this case, the final decision is made by the authorities.

DISCUSSION

Bernstein's concept of Re-Centred State seems appropriate to apply to the Swedish school system and the current reform:

It refers to new forms of centralised regulation whereby the State decentralises and through (a) central setting of criteria and (b) the central assessment of the outputs of agencies, financially (and otherwise) rewards success and punishes failures: 'choice', selection, control and reproduction (2000, p. 78).

In the political rhetoric, teachers are sometimes 'blamed' for the failure of their students. Improving teachers' knowledge and their teaching repertoire may be seen as a way to reform the school. This is also one of the focuses in the diverse and manifold enterprise of the mathematics reform in Sweden. The initiative was taken by the state but the responsibilities for the implementation are moved 'down' in the hierarchy of the school system. Autonomy is encouraged but the state controls through financial support, limits, criteria, inspections, annual reports and national testing. The *differentiated de-centred identities* (market) are empowered, for some institutions more than others. Parts of the reform, for example Read-Write-Count-Project, seem to be influenced by *retrospective identities*. The *integrated de-centred identities* are perhaps too silent in the current school political rhetoric.

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