The construction of mathematical knowledge and learning in and through individual education plans

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This study, which is grounded in Bernstein's theories of symbolic power and control in the context of pedagogy, explores how pupils' learning in mathematics is constructed by a Swedish assessment practice called Individual Education Plans (IEPs). A systematic selection of 233 IEPs from five municipalities constitutes the empirical basis for the study. The results show that the content of IEPs primarily stresses the mastery of elementary skills, with an emphasis on automatization and routinization skills. In addition, regulative discourses about how to perform while learning mathematics are emphasized, especially for boys. The study also shows that IEPs, as they appear in the study, do not reflect the aims expressed in the current curriculum; on the contrary, the practice of using IEPs tends to reproduce a traditional discourse on the content of mathematics and how mathematics should be taught.
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Introduction

In the Swedish school system today, there is an ever-increasing emphasis on assessment and documentation of pupils' knowledge and learning. One of the most recently introduced assessment and documentation practices is the Individual Education Plan (IEP).[1] This reform was introduced in January 2006 with the intention of increasing pupils' and parents' influence over the pupil's learning and development in school, compensating for inequalities between students with different backgrounds, ensuring fairness of assessment, and finally, achieving a higher level of goal attainment in Swedish schools (Swedish National Agency for Education, 2005). Three years after the introduction of the reform, in 2008, the circumstances for implementing IEPs changed in that the IEP would now also include written assessments for subjects in which pupils had received instruction. Today's IEP therefore consists of two parts: one part in which the teacher describes the pupil's

[1] In some contexts, the same plan is called the Individual Development Plan (IDP) when translated into English.

skills in each subject and what the pupil ought to develop further in order to make progress (written assessments); and another part where some specific future learning objectives are drawn up, such as a learning contract (Swedish National Agency for Education, 2008, 2013b).[2]

In practical terms, the IEP reform implies that the teachers and pupils are to evaluate the pupil's knowledge and learning according to objectives for future learning in conjunction with the parent-teacher conference. The IEP is furthermore intended to be a basis for the pupil's learning and is to be used as a basis for the pupil's planning of the schoolwork he or she does independently. The reform is thus in line with the discourse about pupils' responsibility for their own learning and the entrepreneurial subject (Sjöberg, 2011); it is also in line with research on assessment that indicates that formative assessment—that is, making the pupil's learning visible and providing him or her with future-oriented feedback—is important for positive knowledge development (Black & Wiliam, 1998; Black et al., 2003; Hattie, 2009).

In Sweden, IEPs are written up for all pupils in their respective grades. In addition, to help students with special needs to attain the goals set out by the curriculum, a complementary plan that includes supportive measures is drawn up (åtgärdsprogram). Swedish practice thus differs from the way other countries implement IEPs, where the IEP is a document for pupils with special needs only (Mitchell, Moore, & Hornby, 2010).

Evaluations conducted by the Swedish National Agency for Education have shown that the reform has been difficult to implement with good results. In many instances, the plans that have been drawn up have been of poor quality, and teachers do not feel that they had received sufficient support to succeed in this task (Swedish National Agency for Education, 2007; 2010). Several previous studies have shown that the practice of writing up an IEP does not correspond to the intentions of the reform (Swedish National Agency for Education, 2007, 2010; Hartell, 2014; Hirsh, 2013; Mårell Olsson, 2012; Sjöberg, 2014; Vallberg Roth & Månsson, 2009, 2011).

Except for Hartell (2014), previous studies of IEP practice have focused on IEPs in general and not on those drawn up for a particular subject. However, in this study, I have chosen to examine how the subject of mathematics is dealt with in and through the practice of writing up IEPs.

The aim of this study is thus to analyze IEP documents in order to scrutinize how mathematical knowledge and skills, as well as mathematical instruction and learning, are constructed and reconstructed in and through the-

[2] In 2013, the way the IEP is implemented changed again; this time, the change meant that there was no longer any requirement that an IEP be drawn up for pupils in grades 6-9, who were receiving a letter grade in each subject. Moreover, the IEP would now only be drawn up once a year (instead of twice a year) for pupils in grades 1-5 (The Swedish National Agency for Education, 2013).

se assessment documents. In addition, the study aims to examine whether different mathematical content and modes of learning are emphasized for girls and boys, respectively.

Previous research

As has been mentioned above, the Swedish National Agency for Education has conducted two evaluations after the introduction of the reforms in order to investigate how the IEPs function as a practice in schools. The first of these studies, which was conducted only a year after the implementation of the reform (Swedish National Agency for Education, 2007), showed that the IEPs included in the study tended to focus on short-term rather than long-term learning objectives and that the high-performing pupils were those who received the fewest challenges in their future learning by working with IEPs. A year after the introduction of the written assessment part of the IEPs, the Swedish National Agency for Education conducted a follow-up study (2010). This second study showed that the plans, entirely contrary to the reform instructions, contained many comments on the pupils' personal characteristics (see also Hirsh, 2011, 2012). In addition, it was found that, in general, the plans did not use the formative assessment elements, which was one of the reform's intentions. The assessment information found in the plans was often relatively brief and in many instances resembled regular grades. Finally, it was found that IEP practices differed quite a bit between schools and municipalities; something that is not surprising since the instructions in the reform are formulated in such a way that there is great scope for interpretation by each school to design their own IEP practice.

In addition to these evaluation studies, Swedish IEPs have been studied from both a power and a learning perspective. Vallberg Roth and Månsson, focusing on IEPs in pre-school education (2009, 2011),[3] showed in their studies that the content of the plans differs depending on the residential areas the children come from as well as their ethnicity and that the plans function as a normalizing and disciplining practice which subjectifies the pupils in relation to the norm of an ideal pupil (see also Mårell-Olsson, 2012; Sjöberg, 2014). Hirsh (2011, 2012, 2013) has also studied IEPs from a learning perspective and found not only that the plans often become increasingly abstract and written in more and more general and vague terms the older the pupils are but also that many plans do not have a focus on what the pupil is to learn but rather on what the pupil is to do (doing targets) and, notably, how the pupil should behave (being targets) in school. In a later study (2012), she also shows that the plans are gender coded, and that girls and boys are pre-

[3] In pre-school education, IEPs are not mandatory. However, many municipalities have chosen to introduce these plans also in pre-school education.

sented in different ways, in particular in relation to their social skills and development (being targets).

In a study done by Hartell (2014) concerning IEPs related to the subject of technology in Sweden, the researcher found that the IEPs do not fill a formative assessment function for the pupils, among other things, due to the fact that the documents studied rarely included the subject of technology. In the case of schools that made use of template documents, these seldom included the subject of technology. Not even when teachers have the opportunity to compose evaluations in free-text (without checking boxes) do the IEP documents provide much in the way of formative evaluations for the subject of technology.

When it comes to the assessment of mathematics knowledge outside the IEP practice, Björklund Boistrup (2010) shows in her thesis that there is a dominant assessment culture in Swedish classrooms that often implies that the pupil should do mathematics tasks "quickly and correctly," leaving no room for reflection upon the deeper dimensions of the mathematical content. In addition, communication is usually one-way in this assessment culture, where the teacher is the active player and the pupil an objectified recipient. Boesen (2006) also states that tests set by teachers, when compared to national testing, more often focus on imitative reasoning skills, while more complex knowledge forms and communication skills are excluded.

A number of studies (Hansson, 2011; Johansson, 2006; Kling Sackerud, 2009; Palmer, 2010) show that mathematics is increasingly being taught in Swedish classrooms through independent study; that is, the pupils work alone on their tasks in what is termed "individual work" (*eget arbete*) where the textbook controls instruction (see also SOU, 2004:97). The same findings, but with regard to all school subjects, can also be seen in studies conducted by Österlind (1998), Dovemark (2004), Vinterek (2006), Hansson (2011), and the Swedish National Agency for Education (2009, 2012). Vinterek (2006), the Swedish National Agency for Education (2009), and Hansson (2011) furthermore argue that the increased emphasis on both independent study and the pupil's personal responsibility for his or her own learning can be one reason that we currently see increasing variations in levels of achievement between groups of pupils in the Swedish schools.

According to Kling Sackerud (2009), this individualized teaching tradition of guiding pupils working through a textbook is becoming an important part of teachers' work. The subject tradition that the above studies demonstrate prevails in many Swedish mathematics classrooms and is directly contrary to the models for the subject written into the school curriculum. The national curriculum (Lpo 94), which was current both when this study and the other previous studies (mentioned above) were conducted, instead highlighted mathematics as a communicative subject, where creativity and problem solving are key points of departure.

Theoretical frameworks

In this study, Basil Bernstein's theoretical perspective on power is used as the primary theoretical tool for analyzing the empirical material. Bernstein (2000) highlights the ways in which power and social reproduction are realized in and through the education system using the concept of "the pedagogic device". With this concept, he wanted to make manifest that there is a struggle over different ways to interpret, understand, and manage teaching within and between different fields and levels throughout the education system and that education and teaching are never unbiased or ideologically neutral.

One part of Bernstein's theory is grounded in the way pedagogical content is developed and negotiated within various politicized pedagogical fields. The struggle over the content and practice of education and teaching is played out in the *official recontextualizing field* (ORF), where the official pedagogical discourses are formulated for the *pedagogical recontextualizing field* (PRF), where, in turn, the official discourses are realized in different educational settings. The content laid out in the individual education plans in this study is, therefore, the result of explicit and implicit negotiations in several arenas of the education system: from the Department of Education and the Swedish National Agency of Education—who set the rules for and formulate the curricula and syllabuses as well as the rules for IEP practice (ORF)—to the producers of textbooks and other educational materials; educational administrators and politicians in the municipalities; and finally the principals, teachers, and pupils at each and every school (PRF).

The results of the recontextualizing process of the pedagogic device are the *pedagogic discourses* (Bernstein, 2000), which target not only the content but also its transmission and implementation—that is, how the content is transmitted, taught, learned, and evaluated. This part of Bernstein's theories focuses on the pedagogical practice related to knowledge structures in education. Bernstein argues that pedagogical discourses consist of two embedded discourses: a discourse that involves knowledge and skills (*instructional discourse*) and a discourse concerned with social order (*regulative discourse*). The regulative discourse is the dominant discourse and is embedded in the instructional discourse. Both discourses can be interpreted in different ways in different arenas. Within everyday educational practice, this might imply that social order issues will dominate substantive issues, while at a macro level, it implies that skills are selected and constituted according to the foundations of the dominant values of society. Regulative discourse thus determines the distribution of power and control (social division of labor) for both the production of knowledge and knowledge transformation. In this way regulative discourse determines what is seen as possible and conceiva-

ble or impossible and unthinkable in a society, and for different social classes and educational identities as well.

In order to understand the discursive realization of teaching, the concepts of classification and framing are useful analytical concepts for the study (Bernstein, 2000). The term *classification* describes theoretically how different categories are held together or kept separate from each other. Classification thus highlights how different "whats" are to be managed. The term *framing* highlights the degree of control that occurs within a particular activity or phenomenon. The concept of framing also determines how transparent and easily interpreted the pedagogical approach is made. A *visible pedagogy* can be said to be characterized by a strong classification and framing; that is to say, both the content and execution are clearly classified and thus clear for the pupil in the teaching context. A visible pedagogy is, for example, when teachers are clearly in control of what happens in the classroom, when they separate the school subjects or contents from each other, and when it is clear what the teacher's goals and demands are. An *invisible pedagogy* is, in contrast, characterized by weak classification and framing. Examples of an invisible pedagogy are models where the pupil is supposed to seek knowledge independently and produce his or her own presentation or where the pupil works independently on his or her "individual work" (cf. Dovemark, 2004; Hansson, 2011; Vinterek, 2006; Österlind, 1998).

In the case of an analysis of content knowledge and of knowledge forms, Bernstein (2000) used the paired concepts of *horizontal and vertical knowledge discourses*. A horizontal knowledge discourse is characterized by being mundane (profane), segmentally organized, and tied to local contexts (context-dependent); while a vertical knowledge discourse is characterized by being more abstract, conceptual, hierarchically organized, and context-independent (esoteric). Knowledge within the horizontal discourse therefore functions best in a close conjunction with any given practice or context, while knowledge within the vertical discourse is more sustainable in both time and space; that is to say, this knowledge is transferable to other contexts and situations. Unlike the horizontal knowledge discourse, the vertical knowledge discourse implies an opportunity to think outside given frames, to be able to see "the unthinkable". which in itself constitutes an opening for change and consequently power (Bernstein, 2000; Nylund, 2013).

Phye (1997) describes another way to express these different knowledge forms, specifying three different qualities of knowledge: declarative, procedural, and strategic. Declarative knowledge includes relatively simple and atomistic knowledge such as facts, tables, etc. Using procedural knowledge forms means being able to use and combine declarative knowledge or doing routine operations such as algorithms and similar mathematical operations. Both of these knowledge forms are thus characterized by the aspects Bernstein includes in a horizontal knowledge discourse. Phye's strategic

knowledge form, which can be seen as a vertical knowledge discourse, requires different capabilities as well as different teaching methods. Strategic knowledge implies that the pupil knows when and how to use declarative and procedural knowledge by him-/herself and is able to transfer this knowledge into new situations. Problem solving is, hence, a typical strategic knowledge form.

Method

The current study includes 233 IEPs from five municipalities—two medium-sized municipalities and three small rural municipalities—and 31 schools in the western part of Sweden. The pupils for whom the plans were drawn up were 11–12 years old and attending their fifth year of primary school. The reason for choosing grade five for the study is primarily that, at the time the empirical material was collected, the national syllabus for the fifth year of primary school was the one selected for a review of knowledge objectives in the various subjects.

Under Swedish legislation, this type of document is a public record used in public schools, which means that the schools are obliged to disclose them upon request. The plans were collected by means of a systematic selection at each school based on the schools' rosters, which were collected in an initial step. A request was then sent to each school for every fifth pupils IEP. These IEPs were then marked with a school code and a gender code and finally anonymized. The results from the study can hence be generalized within the special setting, but they can also say something about the pedagogical discourses of the IEPs in a more general educational setting.

Of the 233 plans, 128 were written about and for girls and 105 about and for boys. The IEPs included in the study were drawn up in the autumn of 2010 and submitted for the study in the spring of 2011. The scope, structure, and content of the plans differ to a great extent between the schools and also between different classes at the same school. The shortest plan comprises only a few sentences about one or two individual subjects, while the most comprehensive plan comprises almost 20 pages where each subject is presented on a separate page. The differences in scope and content are due to the fact that it is the principal of the school who determines the specific design of the IEPs (Swedish National Agency for Education, 2008). The quantity of the plans, both with regard to the number of pupils of the same age and the number of schools and municipalities, as well as the systematic sampling, has afforded the opportunity for different analyses compared to previous studies conducted in Sweden.

The analysis was carried out in several steps. Initially, every IEP was categorized to determine the number of written assessments as well as the objectives for future learning in every subject dealt with in the IEPs. This part

of the analytical process was done to observe the relationship between mathematics as a subject and other subjects in the IEP documents. In this step, I also scrutinized possible differences related to gender.

Secondly, a textual analysis was carried out in which the content of each plan was classified and coded based on the descriptions of the subject and the knowledge and learning aspects found in the plans. In this step, I focused on the part of the IEP where the objectives for future learning were formulated. Here, Phye's (1997) theoretical concepts of knowledge forms, as well as inductive categorizations based on how mathematics content is presented, were the basis for the analysis. Specifically, every formulation in this part of the IEPs was categorized with regard to both Phye's three knowledge forms (strategic, procedural, and declarative) and the mathematical contextual aspects. These mathematical contextual aspects were being forged while the analytical evaluation was being conducted and were based on the information found in the documents. Five mathematical aspects were finally found: arithmetic, table learning, algorithms, problem solving, and "other." Furthermore, an aspect that focused on the pupil's behavior and ways of handling their learning process was also outlined since it was clearly represented in the empirical material. This aspect was called the "organizational and behavioral aspect." In sum, six categories were finally outlined.[4]

The analysis was then developed by means of a quantitative analysis, where each coding was categorized and put into a quantitative template, the content of which was then tested for significance by means of a chi-squared test to see if there were any differences in content between the girls' and boys' IEPs.

Finally, the formulations in the IEP documents were analyzed using Bernstein's notions of pedagogical discourses. In this step, both the written assessments and the part about objectives for future learning were included. Here, I found four particularly revealing pedagogical discourses in the empirical material.

[4] Examples of formulations in the IEPs related to the categorization aspects: Arithmetic: "Practice and be really sure about the four rules of arithmetic." Table learning: "You need to know all the tables." Algorithms: "Practice written calculations (short division)."Problem solving: "Practice finding solutions and calculation methods relating to problems in everyday situations."Other: "The clock and comparing times and how much time has past." "Form numbers (handwriting)."Organizational and behavioral aspect: "Finish what you are doing." "Keep up the good work, and work as thoroughly and purposefully as you do now."

Results

The extent of mathematical elements in the IEPs

The quantitative analysis of how the written assessment and the objectives for future learning were formulated in the individual education plans shows that mathematics is one of the few subjects—along with Swedish and English—that is dealt with to any significant extent when subject assessments are formulated and new objectives for future learning are drawn up in IEP practice. 73% of the pupils (boys 76%, girls 71%[5]) were given a written assessment of their knowledge in mathematics. The results show, therefore, that, despite legislation requiring that pupils be provided with written assessment in all subjects in which they have received instruction (ORF), this is far from a reality for the pupils whose IEPs were included in this study. Many subjects seem to be entirely forgotten in the IEPs. The fact that so few pupils receive subject-specific assessments is consistent with the findings of both Hartell (2014) and the Swedish National Agency for Education's evaluation (2010), which showed that there was a great discrepancy between schools in both how and whether or not they worked actively with IEPs.

Objectives in mathematics are formulated in terms of future mathematical learning in 55% of the pupils' IEPs (boys 49%, girls 60%). The subject of mathematics is, thus, the only subject other than Swedish where most pupils receive formulated objectives that they themselves are to work towards in their daily schoolwork. When it comes to mathematics, and a few other subjects that are given a lot of space in the formulation of objectives, each pupil might also have several objectives formulated for the subject. In mathematics, a total of 219 objectives were formulated in the 128 plans containing mathematics objectives for future learning (corresponding to an average of 1.7 objectives/pupil), of which the boys were assigned 94 objectives and the girls 128 objectives.

[5] There is no significant difference between the sexes when it comes to the number of reports and objective formulations in the various school subjects, except when it comes to objectives for the subject sport and health, where the chi-squared value is 4.5, which corresponds to a P-value of ≤ 0.05.

Table 1: Relative numbers of pupils (girls and boys) who were given written assessments and objectives for future learning in their IEPs.[6]

	Written assessments			*Objectives for future learning*		
School subject	*Boys N=105*	*Girls N=128*	*All pupils N=233*	*Boys N=105*	*Girls N=128*	*All pupils N=233*
Art	*63%*	*55%*	*58%*	*1%*	*1%*	*1%*
English	*71%*	*68%*	*70%*	*36%*	*42%*	*39%*
Manual arts	*62%*	*63%*	*63%*	*3%*	*3%*	*3%*
Home economics	*28%*	*22%*	*24%*	*0%*	*0%*	*0%*
Mathematics	*76%*	*71%*	*73%*	*49%*	*60%*	*55%*
Music	*49%*	*49%*	*49%*	*0%*	*1%*	*0.5%*
Science	*48%*	*51%*	*49%*	*2%*	*1%*	*1%*
Social sciences	*66%*	*59%*	*62%*	*5%*	*9%*	*7%*
PE	*57%*	*60%*	*59%*	*7%*	*1%*	*3%*
Swedish	*77%*	*69%*	*82%*	*57%*	*50%*	*53%*
Social conduct	*25%*	*30%*	*27%*	*35%*	*31%*	*33%*

The mathematical content of the objectives

In the analysis of the content written into the plans' objectives for future learning, which the pupils are expected to take responsibility for and to work towards, it is clear that there is an emphasis on declarative and procedural knowledge forms in the plans (Phye, 1997). Table learning is the content aspect that is particularly highlighted as essential for the pupils to focus their learning on: 37% of the objectives formulated in mathematics are about automatizing knowledge of tables, especially multiplication tables. Other declarative and procedural skills that are formulated in the plans are knowledge of arithmetic (9%) and algorithm calculation (16%). On the other hand, more complex knowledge (strategic knowledge forms), such as problem solving and logical reasoning, are very rarely formulated into the plans: only 8% of the objectives written contain this type of mathematical content. When it comes to objectives of this nature, there is also a significant difference between girls and boys, where 3% of the objectives formulated for boys compared with 11% of the objectives formulated for girls contain problem solv-

6 The only significant difference between girls and boys is the number of objectives for physical education and health, where the chi-squared value is 4.5, which corresponds to a P-value of ≤0.05.

ing or similar, more advanced knowledge content (chi-squared value 3.88, which corresponds to a P-value of ≤ 0.05).

It should also be noted that a large number of the objectives are not primarily about some mathematical content, but rather about how pupils should do their work and how they should behave in mathematics lessons. Even when it comes to objectives dealing with the pupils' behavior and organization of mathematical learning, there is a significant difference gender-wise: the boys' objectives are concentrated on this type of content to a higher degree than the girls (boys 28%, girls 15%, with a chi-squared value of 4.54, which corresponds to a P-value of ≤ 0.05.)

This result is consistent with both Hirsh (2011)—who also observed that "being targets" and "doing targets" were significant parts in the IEP practice—and the Swedish National Agency for Education's (2010) results, which showed that short-term objectives dominated over long-term objectives in Swedish IEP practice. The study also shows that the curriculum (Lpo 94), which underscores that mathematics should be a communicative and creative subject, is not being reflected when individual mathematics learning is being planned and determined in this documentation practice. Rather, it is a limited part of the curriculum's content—a few achievement targets—that end up dominating entirely when the curriculum is translated into IEP practice (cf. Boesen, 2006). Therefore, when it comes to the content dimensions of mathematics, it is clear that a discourse struggle is waged between the two recontextualizing fields, where the pedagogical recontextualizing field (PRF), classroom practices, and possibly even the textbook actors see areas other than the areas emphasized in the official recontextualizing field (ORF) as important.

Table 2: Relative numbers of objectives for future learning (girls and boys) in relation to the mathematical content of their IEPs.

Mathematical content in IEPs' objectives	*Boys*	*Girls*	*All pupils*
Number of objectives	*N=94*	*N=123*	*N=217*
Arithmetic (declarative)	*8%*	*9%*	*9%*
Table learning (declarative)	*40%*	*34%*	*37%*
Algorithms (procedural)	*12%*	*19%*	*16%*
Other (declarative & procedural)	*9%*	*12%*	*10%*
Problem solving (strategic)	*3%*	*11%*	*8%*
Organizational and behavioral aspects	*28%*	*15%*	*20%*

The results also show that the conditions differ for girls and boys, where girls to a higher extent than boys are given the opportunity to focus their learning on problem solving (boys 3%, girls 11%). On the other hand, boys are given more objectives concerning how they should behave in the classroom in order to facilitate learning, such as focusing on their tasks more and paying more attention in class (boys 28%, girls 15%). For boys, a regulative discourse emerges in the written documentation as more essential for emphasizing than for girls. The girls, on the other hand, get slightly more scope for working with more strategic, creative, and communicative areas of mathematics (Phye, 1997) and with long-term, context-independent, vertical knowledge discourses (Bernstein, 2000), even if this type of mathematics content generally is hardly emphasized for both boys and girls.

Pedagogical discourses that emerge in the pupil documentation

In the qualitative analysis of IEP content, the assessments and objectives all taken together, the analyses also show that particular pedagogical discourses are dominant—discourses that are also very much marked by a regulative discourse (Bernstein, 2000). The most prominent pedagogical discourses are:

- Discourses on time and the pace of the pupil's schoolwork
- Discourses on test results and the pupil's shortcomings
- Discourses on taking responsibility
- Discourses on organization and behavior

Time and pace

In many of the IEPs, regulative statements concerning the pupils' use of time and pace are highlighted. Examples of such statements are as follows:

> It took you 8 min to do 38 multiplication problems.
>
> Faster calculations in your workbook are required.
>
> Slow down the pace to avoid careless mistakes.
>
> If you get started more quickly and use your time more efficiently, you can develop your math skills.

Accordingly, it seems that mathematical knowledge has much more to do with time and pace compared to other subjects in the empirical material, both in relation to practicing math skills and evaluating math skills. Here, declarative knowledge forms and horizontal discourses are often made visible since automatizing and learning by heart seem to be important, as in, for example, doing multiplication problems quickly. The statements also reveal discourses that imply that the amount of practice is more important than the quality of the exercise. In this way, the content of the plans is similar to the assessment culture concerned with doing things "quickly and correctly", as Björklund Boistrup (2010) shows in her study of assessment in classroom environments. Thus, it seems that teachers bear this assessment culture with them also when working with the IEPs.

Test results and pupils' shortcomings

For mathematics, unlike other subjects in the IEPs, it is also fairly common that teachers describe pupils' knowledge in relation to the results of tests and exams: "On the test you got 14 out of 47". When test results are presented in the plans, it is often the only information given about the pupil's skills in mathematics, as if this information is all that the pupil needs in order to know what he or she knows of mathematics and what he or she needs to know in order to develop his or her mathematical skills. Besides the assessment being inadequate in serving a formative function (Black & Wiliam,

1998; Black et al., 2003; Hattie, 2009), this type of assessment comment easily becomes classifying and can reinforce the pupil's identity formation as a pupil who succeeds or fails in mathematics. Nor is it unusual that the descriptions of the pupil and his or her knowledge are formulated from a negative perspective—that is, focusing on what the pupil cannot do rather than what he or she can do—which can also reinforce negative identity formation in relation to mathematics:

> Maria is keen to work and she tries to understand what to do and how to do things. This is difficult and things go wrong easily. Sometimes she draws a blank and her head does not help her.
>
> I find it hard to judge how you are managing what we are doing in math, but sometimes I see that you can do things.
>
> It is important to check regularly that Thomas has understood what he has calculated.
>
> You have some errors in your math book, sometimes this is because you are careless and sometimes because you do not understand the exercises.

Taking responsibility

An approach that, according to the content of the plans, also seems to be important is that the pupils are to take more responsibility for their studies and, consequently, to be held accountable for their progress. Here, two slightly different approaches emerge. The first approach is one in which the pupil is to take responsibility for his or her own "learning" in a more general sense, which is largely similar to the approach to responsibility that is presented in the school curriculum (Lpo-94). This model for doing schoolwork has, according to many scholars, not only become common in Swedish schools but has also had the effect of creating pedagogical segregation (Dovemark, 2004; Hansson, 2011; Swedish National Agency for Education, 2009, 2012; Vinterek, 2006; Österlind, 1998). It is part of the discourse about "the responsible and entrepreneurial pupil" (Sjöberg, 2011). An example of this approach is a girl who, in relation to mathematics, is described thus: "She is good at taking responsibility and works hard". The IEP plans also reveal a slightly different approach to responsibility and which emphasizes "doing" more than learning. In these cases, the descriptions are more about the pupils needing to become more independent in their daily tasks and getting more done in their lessons:

> Go and practice!
>
> You have become more self-reliant and you are getting more work done.
>
> You are now able to work on your own for longer periods of time.

Where the first approach is apparent in the plans (i.e., the pupil's responsibility for his or her own learning), I would argue that this becomes somewhat paradoxical because the content that dominates in the content descriptions is rarely of a kind that the pupils *can* take overall responsibility for but, rather, is about ensuring that these assignments are carried out. Here, a discursive clash emerges between, on the one hand, a (social) discourse about the pupil's taking responsibility and, on the other hand, a discourse on what math skills are in the pedagogical practice (Boesen, 2006; Lundin, 2008; Player-Koro, 2012).

Organization and behavior

As the quantitative analysis of objectives above showed, a large proportion of the objectives (boys 28%, girls 15%) are about how the pupil is to do his or her math tasks and how the pupil is to behave during math lessons. This approach is evident in the entire IEP documentation, even in the parts where the pupil's skills in the different subjects are to be described and assessed. The statements made in the pupils' IEPs contain a large number of descriptions of the pupils' attitudes and actions in the classroom. On the one hand, these may be more or less concrete descriptions of what the pupils are to do during their mathematics lessons or "individual work" sessions*:*

> Try to follow the blue line in your math book to get more challenges and the red line if you have time.
>
> Start each lesson by doing some multiplication cards.

On the other hand, these descriptions may also be regulative descriptions or suggestions that have no, or only a very weak, connection to mathematics. Rather, they serve as a regulative discourse governing the pupils' behavior and organization:

> Stop asking silly questions, think for yourself, and get started on your work.

> Talk less with my friends in class to give myself and the others a good working environment.

These kinds of personal comments are not permitted in IEPs according to the legislation; nonetheless, both this study and other studies (Hirsh, 2012; Swedish National Agency for Education, 2010) show that they occur to a relatively large extent.

Discussion

Several studies conducted by both the Swedish National Agency for Education (2007, 2010) and by Swedish education researchers have previously shown that the introduction of the IEP reform has not been unproblematic in Swedish school practice (Hartell, 2014; Hirsh, 2011, 2012, 2013; Mårell-Olsson, 2012; Vallberg Roth & Månsson, 2009, 2011). This study reinforces the picture of IEPs as a practice that still needs to be discussed and critically examined in order for it to function well in Swedish schools. Based on the results of this study, I argue that some of the problematic issues of IEP practice are about (a) how the subject of mathematics, the teaching of mathematics, and the learning of mathematics are constructed through working with IEPs and (b) how the IEPs function as a power practice in the relationship between teachers and pupils. The IEP functions in this case as a form of symbolic power from both a subject perspective and a power and control perspective (Bernstein, 2000).

The examination of these 233 documents shows in the first instance that a regulative discourse is dominant in IEP practice. This is demonstrated by the fact that both the written assessments and objectives for future learning tend to be about how the pupils are to go about their schoolwork and how they should conduct themselves in the classroom.

When analyzing the interdisciplinary IEP documents, my result shows that approximately one third of the pupils are given objectives for future learning relating to discourses of organization and behavior (i.e., how the pupils are to behave and manage their studies in school). However, the description of the pupil as a person or an ideal pupil does not stop there but is carried over into the various subjects. In mathematics, as much as 28% of the boys' objectives and 15% of the girls' objectives are about how to conduct themselves and manage their studies (see also Hirsh, 2011).

According to Bernstein (2000), the regulative discourse creates principles for selection, organization, and pacing of the teaching content as well as how knowledge and expressions are to be valued and evaluated. The regulative discourse also constructs both the pupil and the teacher and the relationship between them. One thing that becomes clear in the results of the study is that

the IEPs switch between, as well as mix, weak and strong framing (Bernstein, 2000). One of the intentions of introducing the IEPs was to give pupils more influence over their own learning process. They were to be given clear information about what they had learnt in the different subjects and what they were to continue to work on in order to achieve positive knowledge development. In addition, the pupils were to be allowed to set their own objectives to work towards, as in a learning contract, in order to practice taking responsibility for their own education (Sjöberg, 2011; Swedish National Agency for Education, 2005, 2008).

The IEPs are thus part of a development towards a more invisible form of pedagogy where responsibility for both the content and forms of work are more and more palpably handed over to the pupils. The discourse of responsibility also implies that the pupils are held accountable for the result of their responsibility taking and their outcomes in school. However, the results of this study show that, through the IEPs, the teacher retains control over how the learning of mathematics is to occur, but in a more subtle way. The teachers use their responsibility for assessments to state their ideas of how the individual pupil is carrying out his or her task of planning and managing his or her work (Bernstein, 2000). In these assessments, the discourses of time and pace are used by the teachers when they describe the pupils' knowledge and learning. For example, in their subject assessments, the teachers describe when things are to be done, for how long, and at what pace. Control, therefore, tends to be about the pacing of the learning and "organization/behavior" instead of its long-term content (cf. Vinterek, 2006). All in all, this means that the IEPs tend to be about how the pupil is doing his or her work rather than what the pupil knows in relation to the objectives that the curriculum defines. Through the IEPs, the teacher becomes someone who stays in the background, providing implicit suggestions for what the pupil is supposed to do. The pupil does the work based on his or her plan as a self-regulating, accountable learning subject to be once again assessed by the teacher. The problem with this type of weak pedagogical control (framing) and invisible pedagogy is that it can be difficult for some pupils to interpret what the teacher means and what they are supposed to do in school. Another concern is that the teacher's professional teaching role is weakened, and the relationship between teacher and pupil becomes unclear.

Looking at the content that the teachers and pupils highlight as important to work with in the part of the IEP where the objectives for future learning are described (i.e., mathematics' instructional discourse), declarative and procedural knowledge forms dominate (Phye, 1997), such as automatizing the multiplication tables and learning how to show numbers in various forms of algorithms. Strategic knowledge forms, such as learning to solve and communicate problems and to think logically, are rarely a focus in the plans. The pedagogical discourse of mathematics thus becomes an atomistic skills

subject, where learning is about practice, exercises, and drilling skills (Boesen, 2006). In Bernstein's terms, learning thus stops at context-dependent horizontal knowledge discourses and the pupils are not given the opportunity for mathematical learning that can move them on to more context-independent and long-term, stable knowledge. In addition, the pupils are not encouraged to "think outside the box", which inhibits both their mathematics learning and their scope for a more developed pedagogical identity (Bernstein, 2000).

A question that I asked myself throughout my work on this study is whether the IEP documents shed light on what is regular practice in schools (see Johansson, 2006; Kling Sackerud, 2009; Palmer, 2010) or whether the IEP practice, through its pedagogical logic, further reinforces the tradition of mathematics as a skills subject, which in many respects is characterized by "calculation" and which to a large extent is controlled by the content of the textbooks. My reasoning is based on an idea that teachers, in part because they want to set objectives that are easy for the pupil to both manage and evaluate, end up in this skills-training content. Could it perhaps be that math instruction done outside the IEP work has more of a strategic and communicative content and, thereby, includes more of a vertical knowledge discourse? This study cannot answer this question, and I would also make clear the limits of my study since the empirical material consists of the IEP documents and does not include the entire IEP practice. On the other hand, we can see that if teachers and pupils follow the idea of the reform that the IEP should be the basis for the pupil's independent learning in school, then the pedagogical discourse made visible through these IEPs implies that the teaching becomes both meager and simplistic. This is problematic because this pedagogical discourse can lead to the pupils easily losing motivation and interest in mathematics and because the pupils' more advanced mathematics knowledge consequently ends up taking up less of the total time spent on teaching. This would, in that case, be a great challenge since the Swedish pupils, according to the PISA result (Swedish National Agency for Education, 2013a), are in particular need of more advanced mathematical knowledge in order to compete with pupils in other parts of the world. This seems to apply in particular to the boys, who, according to this study, receive the fewest mathematical challenges within the IEP practice.

Finally, this study shows that there seems to be a discursive struggle between the public recontextualizing field (ORF) and the pedagogical recontextualizing field (PRF), both in terms of how the IEP practice is to be shaped and how mathematics teaching (through IEP work) is to be carried out. It might be the case that part of the struggle is a result of the clash between the strong traditions of teaching mathematics, with both strong classification and framing (Lundin, 2008; Player Koro, 2012), and the weak framing of the IEP practice. A consequence might be that both the discursive

practice of the subject of mathematics and the IEP practice must be called into question because it should be possible to develop both mathematics and IEP practice into something positive for all pupils—boys and girls—and for teachers.

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