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Achievement as a Matter of Choice?

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The contribution reports an initial analysis of the first mathematics lessons of two classrooms at the beginning of secondary school in Sweden from an ongoing research study. The comparison discusses similarities and some differences in the ways in which the teachers facilitate students' access to mathematical knowledge with a focus on episodes that refer to the transmission of the criteria for the production of legitimate contributions.

Introduction

Two classrooms at an upper secondary Swedish school are investigated in the context of an ongoing international study of classrooms in Germany, Canada and Sweden. We seek to identify discursive and interactional mechanisms that can explain emerging disparity in achievement in mathematics classrooms at the beginning of secondary school where the students and their teachers are together for the first time [1]. The Swedish data comprise video-footage of the first eight respectively nine mathematics lessons in the two classrooms, recordings of interviews with all students and one of the teachers, copies of a test from one of the classrooms, textbooks and other material used as well as information about the students' social, cultural and economic backgrounds. Both classes are beginning an obligatory mathematics course ("course A"). Completion of the course comprises a national test. The results are meant to inform the teacher's grading and are also reported to the school authority. Teachers also administer their own tests. The curriculum prescription for the course is outcome based and does not include recommendations for the order of topics, time allocation, pace and teaching methods. The grading system comprises four levels: not pass, pass, pass with distinction, and pass with special distinction.

Due to limited space we can only present some excerpts from the first lessons that deal with the transmission of the criteria for the production of legitimate contributions. Our discussion however also draws on additional information from what we have seen in the consecutive lessons as well as on a preliminary and rather cursory analysis of the textbooks and the interviews. We have not yet analysed in detail all the conversations between teacher and students that happen in both classrooms throughout the lessons when the teacher talks to individuals or to a group.

Theoretical background

In the following, we employ Bernstein's (1990, 2000) concepts of classification and framing for characterising the classroom practices. Classification generally refers to the strength of boundaries established between discourses, agencies, physical and social spaces, while framing refers to the principles that regulate how a discourse is to be transmitted and acquired in the pedagogic context. In our analysis, classification refers to categorizing areas of knowledge in the mathematics curriculum. Strong internal classification means that clear boundaries between mathematical sub-areas are maintained. Strong external classification indicates that few connections are made to other disciplines or everyday practices. At the micro level of pedagogic practice, framing refers to the options the students and the teacher have in the control over the selection of the communication, its sequencing, its pacing, the evaluation criteria for the knowledge, and the social base which makes access to the knowledge possible (Bernstein, 2000, p. 12-13). According to Bernstein, variations of classification and framing relate to differential access to institutionalised knowledge. Evidence for this theoretical claim has been produced by a range of empirical studies (e.g. Chouliaraki, 1996; Cooper & Dunne, 2000; Gellert & Jablonka, 2009; Hasan, 2001; Lubienski, 2000; Morais & Miranda, 1996). For being able to deliver a legitimate contribution, students not only need to have access to the classificatory principles of the knowledge that is transmitted, but also need to share the behaviour, aspirations, attitudes and values favourable to the context, that is, they need access to both the instructional and the regulative classroom rules. Specific instructional and regulative classroom rules can be seen as modifications of the underlying principles of classification and framing.

The case of the class enrolled in the Arts Programme

The 31 students in this classroom are enrolled in the Arts Programme (Estetiska programmet, short: ES) of the Gymnasium. They come from different comprehensive schools; most of them do not know each other. Mathematics is the only subject the teacher teaches in this class.

Choosing the suitable level of tasks

The first meeting between the students and the teacher was not planned to be a "lesson", but was devoted to organisational issues. One of the researchers happened to be there and made field-notes. After a personal introduction the teacher describes the mathematics course as basically a repetition from year nine. Then the teacher hands out the textbooks and explains:

Teacher: The book is grouped by levels and you will get a feeling which level suits you. [This is not a literal translation. In Swedish this sentence reads: Boken är nivågrupperad och ni känner själv vilken nivå som passar.]

After calling up the names of all students (three or four are absent) they are told:

Teacher: You will have to calculate a lot by yourself during the lessons.

Then follows an exchange of the students' previous experiences with school mathematics which leads to a short discussion about whether the "A tasks" in the book might be at the level of "pass". Throughout the book, all tasks are labelled (by colour and letters) as category A, B or C, some are labelled as "open". According to its title, this textbook is especially designed for the course A within the Arts Programme. On the first page there is a short explanation (addressed to the students as the readers) of the differences between the tasks:

After the theory exposition follows a solved example that illuminates the theory. There are tasks at three different levels and of different character. Open tasks do not have one given answer and often require a mathematical discussion. A tasks are standard tasks that generally can be solved in one step, while B tasks often require a solution in several steps. C tasks are more complex in their character and for solving them you need to, amongst others, apply mathematical knowledge from several areas .

This description conveys that the labels A, B, C constitute a hierarchy of levels of difficulty, composed of "standard one-step tasks", "several-steps tasks" and "complex tasks". The status of the open tasks remains unclear. In the chapter the class deals with within the first lessons ("tables and diagrams") there are 25 A-tasks, 12 B-tasks and 2 C-tasks. There is only one open task (amongst the B-tasks) in this chapter. The textbook contains an answer key.

A possibility of s subsequent re-grouping

When the students come in to join the first lesson (and also in the consecutive ones) they are free to choose where they want to sit in the classroom. At the very beginning, the teacher hands out a working plan containing the page numbers of the textbook where the tasks to be dealt with can be found for the term and comments:

Teacher (01:20): Er, yes, we then can start by handing out a plan here... which runs to the break [autumn holiday]... ehm... why I did not do it for longer than until the break... because I will get to know you a little bit and see a test... roughly what level we are at... in order to/

Student: /I think this, too/

Teacher: /be able to do maybe a little re-grouping... maybe... because this is such a real big group... if all are here... because then you are actually thirty-two... be able to give some [students] permission that you go somewhere else and work for a while. In a group or so on... but I will have a little check-up on... and how fast we can go forward...and how fast I can push on the planning so to

insert maybe more repetition time before the national test and so on... hence so we stop the planning until week forty-four.

By means of employing several hedges, the teacher seems to be mitigating the impact of the announcement of an upcoming test that will lead to tracking (“to know you a little bit”, “roughly what level“, “do a little re-grouping”, “maybe”, “a little check-up”, “and so on”). The criteria for “getting permission to go somewhere else“ remain hidden, achievement levels are not mentioned, but only a spatial separation of groups, argued by the actual group size.

Attempts to uncover the relation between the task levels and grade levels

Then the students start working with the textbook tasks. They can choose whether they talk with their peers, get help from the teacher or work on their own. After some minutes, a student sitting at the back calls the teacher by raising her hand. As can be seen from the video, some of the other students in the classroom stop working and listen to the conversation (all names are pseudonyms).

- Teacher (07:33): So.
- Anna: With these tasks... then... should one do A B or B C or only one of those
- Teacher: Ehm...
- Anna: So if we say that I have done type A tasks... will one then pass the test or does one need B tasks in order to get all tasks done [in the test]... because sometimes it is like this [?] tasks C... that is how it was in lower secondary...which come in the test... if I had done A I did not grasp what it was all about.
- Teacher: Nope... these are grouped by level of difficulty and if you go in the first place for solving A tasks and it works very well on the A tasks... then you probably don't need to solve all A tasks... but then you go to a B task which is a bit harder and take up a challenge.
- Anna: Yes/
- Teacher: /And the C tasks are of course a bit more tricky.
- Anna: Yes...
- Teacher: But the minimal requirement is that you have done A tasks to an extent where you feel that it works well with the A tasks.
- Anna: Well that is also a challenge.
- Teacher: Yes and then we will take it on [the challenge] together.

Anna wants to find out at which level the tasks in the test will be. It is not clear whether she means the teachers' or the national test. The teacher's first answer does not refer to the test. Instead the student gets a rather vague instruction of how to move through the tasks: “probably [you] don't need to solve all A tasks”. It is left to the student to judge at which point she feels that “it works well with

the A tasks”. The teacher repeats this in the second comment when saying that she is supposed to have done A tasks “to an extent where you feel that it works well”. Being able to solve A tasks seems to be a minimum requirement for passing the test. However, the teacher also wants to encourage the student to do more than just a minimum level and solve tasks that are “a bit harder” (B tasks) or even “a bit more tricky” (C tasks). The student insists that the A tasks are also challenging. The teacher agrees and offers help.

In the second lesson, the students again work individually on the textbook tasks while the teacher walks around between the desks talking to students. There is no exposition by the teacher. In the middle of the lesson a group of students calls the teacher:

- Thomas (33:52): You [name of the teacher] I’m wondering about something.
- Teacher: Yes...
- Valter: No we are wondering about something.
- Teacher: Well we then will make a collective wondering/
- Thomas: /Does one have to/
- Valter: /Does one have to... it is A here and B and also C here does one have to do a task for all...
- Teacher: Yes you should if you feel that you succeed very well with the A tasks then you will have to get up a level and do B tasks yes of course.
- Thomas: But A counts as G [abbreviation for pass] B as VG [abbreviation for pass with distinction] and C as MVG [abbreviation for pass with special distinction]
- Teacher: Yes roughly it can indicate that it is roughly that level of difficulty for the somewhat more difficult B tasks but one stretches oneself up a little extra when sorting out the B tasks...
- Hannes: But [for the] B tasks it is unnatural.
- Teacher: No of course you should sort them out.

These students, again, inquire about the meaning of the task levels. The teacher provides the same instruction as to Anna in the previous lesson: If they feel that they succeed very well with the A tasks, then they should solve B tasks. These are now described as being “up one level” and as “somewhat more difficult”. The students suggest a relation between the three task levels and the three pass grades. The teacher seems to agree as far as the first two levels are concerned but leaves the suggested relation between the C level and the pass with special distinction uncommented. It is unclear what Hannes means by “unnatural”, but the teacher takes it as opposition to the suggestion of moving on to the B tasks.

Eventually, thirteen students do not pass the test announced in this lesson, although according to the teacher it would only contain A-level tasks.

The case of the class enrolled in International Baccalaureate

The class comprises ten students, who formally follow the same curriculum (course A) but aim at an international degree (IB). The language of instruction is English. They do not know each other as they come from different comprehensive schools and even from different areas of the country. The teacher only teaches mathematics in this class.

Choosing one's goals

At the start of the first lesson, the teacher hands out the English language version of the official course plan from the school authority. The 2-page document contains short outcome-based descriptions for a range of topics, phrased as the ability to use the named repertoire of mathematical procedures and concepts in different situations. Under the heading "evaluation criteria" the criteria for each of the three levels of "pass" are described. During the first 20 minutes of the lesson the teacher illuminates the descriptions of the topics and then moves on to the evaluation criteria. Some students look at the handout, some look uninvolved. They do not talk. In the interviews, some of them actually say that they did not pay much attention.

Teacher (22:15): What about the grades... have you looked at the grading criteria that you have... you have it at the back [of the page]... we have pass ...pass with distinction and pass with special distinction. If you are aiming for... pass... and I hope that is your least goal to get a pass...hopefully a higher grade and at least a pass should be your goal... then you are...or you must use appropriate concepts... learning what about what different things are called what different methods to use and how you solve problems. And for pass it's required that you can solve problems in one step...at least... and some oral and written reasoning of course... that is important that you can show your work both orally and in writing... it's difficult to know how students are reasoning sometimes if you don't see it... and then use of course mathematical terms and symbols and so on... and understand and know what that is. And that you also can differentiate between guesses and assumptions...when you are given facts you don't think you can solve... and some proof.

Teacher (24:18): To get pass with distinction...the biggest difference between pass and pass with distinction is that you can solve more types of problems... you can use... maybe use several methods to solve one problem... and you can connect different knowledge when you do your reasoning... and that you have a more deeper knowledge so that you can interpret different kinds of situations and when you solve your mathematical problems.

This expansion of the evaluation criteria matches largely what is stated in the text about pass and pass with distinction. The teacher basically reads out what the text

says. According to the official interpretation of the Swedish grades the pass level should not be taken as the minimum threshold but as the outcome expected to be reached by all students. This might be the reason why the teacher focuses on the pass criteria, only shortly mentions the pass with distinction, and does not talk about the pass with special distinction. “Have you looked at the grading criteria?” has to be taken as a rhetorical question. Then the teacher suggests that the students already have made a choice about which grade level they intend to reach.

After the expansion on the criteria, the teacher again addresses the students’ goals:

Teacher (25:07): What is your goal... is that a question one is allowed to ask...have you thought about that...do you think about that now when you have started to take the different courses...what level do I want to achieve with my studies... do you think about that sometimes...would you...that is a good thing to think about because sometimes you have to choose...and think hard about what you want to achieve...or maybe I will put a pass with special distinction for everyone in the class...that would be nice... that would be good...mm...

“Is that a question one is allowed to ask” might be taken as an invitation to consider their goals more consciously and at the same time weakens the obligation to respond. The comment about everyone achieving pass with special distinction is to be taken as encouragement (and not as a form of sarcasm), as such an outcome is indeed an intended possibility within the framework of the grading system.

How to work with the book

In the following part of the lesson, the teacher introduces the book:

Teacher (26:18): Let’s move on then... and see what kind of a... book you are going to use... [the teacher hands out the books]... this one covers both A course and the B course and then some more... and I want you to sign for your textbooks of /I think I have one to many/

After a discussion about writing the names into the book and an expansion on general features of the book (such as lay-out, suitability for the course), the teacher advises the students to look at the sections with the worked examples and then start solving all odd numbered tasks in the category “on your own”. Only for odd numbered tasks there is an answer key.

Teacher (30:33):... the examples in the book are almost always very good to look at the examples... and then if you see... you have...all over in the text... you have... exercises... but we normally don’t do them...not those exercises... you may of course if you want to but you don’t have to... but when you get to page seven... then you will see you’ll find exercises on your own... those are the exercises that we are going to work with... and we only do the odd ones...that does not

mean the weird exercises... just the odd ones and you will do 1... 3..
.5... and so on... because that's what you have answers to... just the
odd ones... and then that will be good enough...

That solving the odd numbered tasks “will be good enough” can be interpreted as referring to the pass level. The work set up in the subsequent lessons (in the first three weeks that we have observed), which consists most of the time in the students working with the tasks in the book, does not appear to contain opportunities to acquire all of the modes of work mentioned in the criteria (such as explaining the reasoning orally or in written form).

Discussion

Framing and classification: the implicitness of the criteria

Weak framing is apparent in both classrooms, although to a different degree. In both groups, the students can choose their own pace for working with the tasks. Framing over the communication is weaker in the ES lessons: When solving tasks, students can choose, for example, whether they talk with their peers, get help from the teacher or work on their own, and discussion with peers is explicitly encouraged. We do not see many efforts on the side of the teacher to control the students' participation. The option of openly discussing is usually not available in the IB lessons. There is stronger regulation about the selection in the IB group, as all students are told to work through the odd numbered tasks, although the teacher encourages the students to move on if they feel already familiar with some tasks. In the ES class, the students have to make their own decision about the amount and level of tasks.

In both groups, students have an apparent choice over the criteria as far as they can “choose” out of a given set of levels or grades to aim for, if they want to achieve more than pass. While in the ES group some students try to get their teacher to reveal the criteria, in the IB there is a prospective announcement. Being able “to differentiate between guesses and assumptions” and “some proof” (both at pass level) indicate a move into the esoteric domain of academic mathematics. The inclusion of these in the pass criteria reflects the intention to initiate all students into this domain. However, the criteria remain unspecific as they are stated independently of the context of acquisition of a particular mathematical topic. Further, the statements are hard to be interpreted by the students, as there is no relation of these to a mathematical practice which the students are already familiar with. Consequently, the prospective announcement of the criteria in the IB class cannot be considered to be of much help for the realisation of a legitimate contribution.

According to Dowling (1998, 2007), school mathematics text that contains formal mathematics expressed through mathematical symbols constitutes the esoteric domain. This is quite different from descriptions of everyday situations

by means of non-specialised language in contextualised tasks. Such descriptions recontextualise domestic practices by casting a school mathematical gaze on them and constitute the public domain of action. The students get access to the esoteric through the public domain.

In both classrooms the textbooks operate mostly within the public domain of recontextualised domestic practices, with occasional insertions from the esoteric domain. The books also include hybrids between those: Descriptive domain text, where the expression is conventional mathematical language though its object of reference is not institutionalised mathematics, and expressive domain text, in which a mathematical concept, operation etc. is expressed via non-mathematical signifiers (cf. Dowling, 2007, p. 5).

The IB textbook contains more esoteric domain text, that is, the external classification of the content seems to be stronger than in the ES book. However, we see a mismatch between the criteria for the grades and the evaluation principles manifested in the solutions to the odd numbered tasks given in the answer key. The notion of proof is not specified in the textbook and the tasks do not invite alternative strategies and/or solutions. Our analysis of the ES textbook suggests that the grouping of the tasks does not reflect the grading criteria stated in the official curriculum documents. The explanation provided on the first page of the textbook about the task levels in terms of steps to be carried out applies to many of the A and B tasks, most of which are contextualised tasks. The tasks in the category C are different from the A and B tasks as some resemble more of a mathematical puzzle and can be classified as a recontextualisation of “recreational mathematics”.

Consequently, in both classrooms the criteria for legitimate contributions at different grade levels remain hidden. All the students know is that they have to work through the A tasks as a minimum requirement for the pass level in the ES class, and through the odd numbered tasks in the IB class respectively. The students in the IB group might feel more sure about what to do in order to pass the course, although some might perhaps think that the even numbered tasks are more advanced. In the ES group some students might work from the hint that the B and C tasks are important for getting a higher grade.

While contextualised tasks dominate in the textbook of the ES class, the test focuses on mathematical notation (exponents, fractions) and operations (three out of eleven tasks were contextualised). The weakly classified and framed practice appears to have minimised the access to forms of school mathematics knowledge valued in the test and in higher education, in particular for the students who did not pass the test. The criteria remain implicit, also in the test, and, as can be inferred from the interviews, many students are not aware of the teacher’s goal of identifying groups of students according to achievement. The choice for solving tasks that suit their own level turns out to amount to self-exclusion. The success-

ful students must have acquired the classificatory principles of the practice they are starting to participate in somewhere else.

The teacher as coach: is this a pedagogic transmission of knowledge?

Theoretically, as the criteria are transmitted in the course of the practice into which the students are being introduced, continued weak framing over the criteria cannot lead to the establishment of strong classificatory principles. However, in these classrooms the teachers delegate the instructional discourse to the textbook that regulates the academic performance of the students. In the first lessons, both teachers set the rules for how to work with the book. When solving the textbook tasks, the students do not have many options over how the knowledge is to be communicated. There are only short written solutions, which can be looked up in the answer keys of the books.

In the lessons we have observed in the ES class there is virtually no whole class exposition from the teacher, in the IB there is some. In both classes the students spend most of the time working through the tasks in the book. The teacher is involved in the process usually only when students ask for help or have a question. This is typical of many Swedish classrooms, although the complete absence of teacher exposition in the ES group is an extreme case. In the two classrooms under study the size of the group makes a difference to what can be counted as public discourse. In the small group of the IB, the conversations of the teacher with single students are more likely to be audible for the rest. This is not always the case in the ES group and not all of the students are sufficiently alert to pay attention to such conversations, especially when they are preoccupied with solving tasks. So it is a consequence of the initiative of single students to get the teachers' comments on their work in order to have access to the criteria. In the IB classroom in such a case the other students more easily could profit from such interaction by attempting to listen.

As the teachers in these classrooms are there more as a resource for the students rather than as guarantors of knowledge transmission, it is the students' own decision how to make use of this resource. Especially in the ES lessons, there is no obvious sanctioning of a lack of participation. Success is likely to depend largely on study habits and behaviour. The personal characteristics of the students, such as organisation, concentration, confidence when facing difficulties and autonomy are perhaps the most important characteristics that create the teachers' expectations of the students' achievement in the IB classroom. In both classrooms, a "habitus" that represents favourable study habits is likely to account for successful participation and thus to (re)produce social identity and destiny (Bourdieu & Passeron, 1977).

Notes

1. For a broad description of the theoretical background and the methodology, as well as for a literature review we have to refer to the documents provided on the website (<http://www.acadiau.ca/~cknippin/sd/index.html>).

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Transcript conventions:

- (01:20) Time in minutes and seconds after start of the lesson
- / Cutting off speech of another person
- ... text Pause of three or less seconds, respectively where it would be in the English translation
- text ... At the end of a turn, three dots indicate absence of fall in tone (often raising intonation)
- [text] Transcriber's or translator's comments