Learning subjects in school - being outsiders or insiders in the disciplinary discourses of mathematics and Language 1

Abstract

How do students learn two very different subjects? In order to investigate students' learning in mathematics and language 1, upper secondary school students were interviewed. Their stories, created the background for the analysis which revealed varying degrees of inclusion in the two disciplinary discourses. The students explained their learning differently. The successful ones used the disciplines' specific languages, displayed disciplinary understanding, insight and a meta-awareness. This was however, absent in the less successful students' stories. The study reveals that students' participation in a subject's discourse is crucial in order to learn the subject. As a conclusion it is argued that today's focus on basic skills may obscure rather than solve the problems for those not included in subjects' different disciplinary discourses.

Keywords: Mathematics and Language 1; Identity as learners; Language as mediation; Disciplinary literacy; Inclusion in disciplinary discourses

Highlights: Learning is mediated by metalinguistic awareness in different contexts.
Participation in the disciplinary discourses is crucial for students' learning.
Focus on basic skills will not solve problems for those not included in subjects' discourses.

1. Background, introduction and research question

Language 1 (L1) and mathematics are considered important subjects in school. However, as disciplinary subjects they are very different and demand different prior understandings and modes of thought. In a time when educational policy increasingly places weight on the more testable basic skills reading, writing and numeracy (Kunnskapsdepartementet, 2006), it is important to be aware of disciplinary differences as these are crucial to students' learning. When basic skills are prioritised over specialisation in school subjects, the different disciplinary subjects' characteristics and meaning are obscured (Kleve, 2012; Meyer & Benavot, 2013; Sawyer & Van de Ven, 2007).

Kleve and Penne (2012) presented a theoretical discussion of mathematics and Norwegian (here L1) in a phenomenological perspective, and explored the two subjects. Emphasising the disciplinary differences in the two subjects they argued for need of awareness of differences in the discourses and modes of thought. The reasoning was based on students' different prior understandings of the schools' activities and goals. When starting school children have different experiences with books, literature and arithmetic and different affinities in relation to letters and numbers. These prior understandings, which encompass experiences, language, habits, affinities and feelings, constitute what Gee (2012) calls their "primary Discourse".

> Primary Discourses constitute our first social identity, and something of a base within which we acquire or resist later Discourses. They form our initial taken-for-granted

> understandings of who we are and who people "like us" are, as well as what sorts of things we ("people like us") do, value, and believe when we are not in public (ibid., p.165).

The primary Discourse is a value Discourse which forms part of different networks of meanings. It may, or may not, support school activities. Some students feel comfortable with the school subjects' discourses because they fit in with aspects of their primary Discourse, while, for others, these discourses may be more or less foreign (Zevenbergen, 2001). This is a challenge in a learning context. School is more or less about constant meetings with new and different thinking and texts, what Gee calls "secondary Discourses". Ideally, the purpose of formal education is to encourage openness to unfamiliar and new secondary Discourses (Gee, 2012). Sfard and Cole (2003) emphasised exclusion from the mathematical discourse in school as a main reason for students' frequent failure to become mathematically literate. According to Shanahan and Shanahan (2008), an important purpose of schooling should be to introduce students into the subjects as *insiders* which they argued requires disciplinary literacy, meaning "literacy skills specialized to history, science, mathematics, literature, or other subject matter" (p. 44).

This introduction creates a background for the qualitative study presented here, about learning L1 and mathematics, and the challenges many students meet in their learning processes. How did they account for the construction of their disciplinary understanding? Based on interviews with upper secondary school students, stories about participation in the school's secondary Discourses which was found being closely related to their identity as learners (Gee, 2001) were analysed. The research questions were: *What stories do students tell about their own learning processes in the two subjects and what do they tell about their own failure and/or success?* And, *what do they say about themselves as learners in a school setting, and their identity as a learner?*

2. Theoretical perspectives

A Discourse is a community of meaning, of ways of thinking to understand the world or a part of the world. Discourse gives meaning, a feeling of inclusion and identity. Within a Discourse, some frames may be obvious while others are more fluid.

Students' different prior understandings will, therefore, naturally affect the learning contexts. This is because of what Gee terms as a possible "institutional identity" (Gee, 2001). Another aspect of identity which is currently dominant in our individualised culture, is what Gee (2001a) terms affinity identity. Institutional identity mirrors the extent students are

consciously aware of, and accept their role as learners in school, whereas "affinity identities focus on distinctive social practices that create and sustain group affiliation rather than on institutions or discourse/dialogue directly" (p.13). According to Bruner (1996) students need awareness of different contexts and framings; they have to learn to take an active part in school as an institution:

> Education in the developed world has become institutionalized, it behaves as institutions do and often must, and suffers certain problems common to all institutions. What distinguishes it from others is its special role *in preparing the young to take a more active part in other institutions of the culture* (Bruner, 1996, p. 29 italics here).

Learning in a school context requires hard work. In order to find meaning in school, and to give it priority, you need to accept the student role - to put your student identity at the forefront. In our data we see that, in order to be a successful student, you have to be open and curious, you have to listen to others and you must be persistent. This attitude to learning will gradually change or transform your language - your mediating language in the learning process - and develop literacy (Gee, 2012; Penne & Skarstein, 2015; Wertsch, 2002).

David R. Olson (1994) observed that "Literacy is, of course, competence with a script; different scripts recruit different competencies" (p.273). School subjects belong to different textual communities, and to master a school subject is to develop the ability to interpret and understand different texts:

> To be literate it is not enough to know the words; one must learn how to participate in the discourse of some textual community. And that implies knowing which texts are important, how they are to be read and interpreted, and how they are to be applied in talk and action (Olson, 1994, p. 273).

The development of a metalinguistic awareness of discursive marks and distinctions transforms children's understanding. Bruner's work on 'modes of thought', makes this his main point:

> If the limits imposed by the languages we use are expanded by increasing our 'linguistic awareness', then another function of pedagogy is to cultivate such awareness. […] In sum then, 'thinking about thinking' has to be a principal ingredient of any empowering practice of education (Bruner, 1996, p. 19).

Based on Bruner's (1986) distinction between paradigmatic and syntagmatic modes of thought, working in mathematics and L1 requires different modes of thought or 'modes of apprehension'. For example, in mathematics, generalisation is a central focus of mathematical argumentation and activity. L1 is primarily interpreted hermeneutically and contextually (Kleve & Penne, 2012).

For Bruner, the syntagmatic mode of thought (primarily narrative) requires hermeneutical ways of reasoning, *contextualised interpretations.* The paradigmatic mode of thought is linked to a scientific way of thinking that requires arguments based on *decontextualised generalisations and explanations* (as in the case of mathematics). It requires the acknowledgement of an abstract system. In a learning process, both modes of thought require meta-language. The two modes of thought cannot be separated, but they have different priorities in different disciplinary contexts (Kleve & Penne, 2012).

Highlighting the connection between content knowledge and the ways learners relate to that knowledge, Boaler (2002) referred to Herrenkohl and Wertsch (1999) who claimed that "students do not only need to develop the skills they need for critical thinking, they also need to develop a *disposition to use* these skills" (Boaler, 2002, p. 19, italics here). Kleve and Penne (2012) argued that dispositions to use these skills must be developed within each discipline and they are different in L1 and mathematics. Sfard and Cole (2003) emphasised both the ability to use a mathematical discourse and when to use it: "*being mathematically literate means to be a* skilful *and* proactive *participant of literate mathematical discourse*" (p.5, italics in original). Thus they formulated two conditions for mathematical literacy: "the command of the literate discourse and the ability to use it" (p.7).

Sfard (2001a, 2001b) conceptualised learning as an initiation into a well-defined discourse. She emphasised that the mathematical discourse is made special by its dependence on "communication-mediating tools", and that there are particular meta-rules that regulate this communication. Herrenkohl and Wertsch (1999) emphasised that students need to develop dispositions to use a disciplinary language. This means that taking part in a new discourse requires shifts on a meta-discursive level, and trying to understand a secondary discourse through one's everyday or primary discourse, will not lead to learning (Gee, 2001, 2012; Kleve & Penne, 2012; Sfard, 2001a, 2001b; Solomon, 2009).

This study focus on the students' identities as learners in a school context. Seeing "identity as a conceptual bridge between learning and its cultural setting", Sfard and Prusak (2005b, p. 1) looked upon identity as narratives and operationalised the notion of a person's identity as a set of stories expressed about the person (Bruner, 1990; Sfard & Prusak, 2005a). "Identity is central to any socio-cultural account of learning. …[I]t is central to students' beliefs about themselves as learners" (Solomon, 2009, p. 26). Focusing on mathematics, Solomon (2009) argued that studying and understanding a learner's identity in a practice is key to understanding their exclusion from, or inclusion in, a school subject. She introduced the

concept ‘identity of inclusion’ that involves seeing oneself as a participant in a community of practice. Conversely, many students in her study reported themselves in terms of non-participation in a discourse and thus expressed identities of exclusion.

3. Methodology

In Norway students have equal opportunities for schooling in primary and lower secondary, meaning they go to official state schools with the same curriculum and same allocation of resources. It is not until upper secondary admission to schools is based on grades from earlier schooling. Within the current curriculum teachers are free to choose teaching methods. However, in Scandinavia there is a long tradition (in Norway since 1939) for student oriented methods in school, inspired by John Dewey.

Solomon and Croft (in press) suggest that students’ engagement or disengagement in mathematics is underpinned by students’ understanding of the nature of mathematics and their self-positioning within the subject rather than being a matter of ability. In their study, they focused on university students’ accounts of the kind of teaching (whether didactical or explorative) they had experienced before entering university, and claimed that “teaching in the English school system produce alienated relationships with mathematics” (p. 1). In this study teaching methods were not the focus. It has a phenomenological perspective focusing on the students’ own stories about their learning processes in the two subjects. What did they say about themselves as learners in a school setting?

Two classes in two different upper secondary schools (School A and School B) were observed throughout a year. Both classes were taught with an open and student oriented approach. Twenty-two students (seventeen years old) were interviewed focusing on the two subjects, mathematics and Norwegian (L1). School A (from which 10 students were interviewed) is located in the city centre. This school is popular, has many applicants and therefore students with good grades from lower secondary are accepted. School B (from which 12 students were interviewed) had enrolled students with lower grades. The classroom observations formed the background for the interviews. The researchers’ presence in the classroom offered possibilities to recruit students for the study. A list was circulated on which they were asked to put their names if they wanted to participate. About half of the students in each class signed and thus volunteered to be interviewed. The interviews were jointly carried out by the researchers. The purpose of interviewing students about L1 and mathematics, was to encourage them to describe the subjects’ similarities and differences on a meta-level with

each subject's language (Kleve & Penne, 2012a). The interviews were semi-structured and conducted towards the end of the students' first year in upper secondary school. The interviews were audio recorded and transcribed, and the transcripts from the twenty-two interviews were subject for analysis of both researchers. For this article 3 interviews from each school were selected. A typical interview question was: How did you experience your mathematics and L1 education going from primary to lower secondary school? And from lower to upper secondary? They were also asked what they remembered from the textbooks they had used in the two subjects, and asked to compare the textbooks in L1 and mathematics. Such questions revealed how they used the mathematics and/or L1 disciplinary language and their modes of thought in their disciplinary reasoning. The level of meta-awareness revealed in their stories, what Bruner (1996a) called "linguistic awareness" (p. 19), was a crucial issue in this study. How did they use the two subjects' specific language? To what extent did they display a meta-perspective on their own learning? The patterns revealed can be linked to the students' discursive and institutional identity.

4. Data analysis

School A

So what does learning a subject in school entail, and how is a successful student constructed? School A, which had motivated students obtaining good grades, is presented first. The students were active and positive and had a well-developed identity as learners. The three presented here were representative with regard to school identity and motivation for learning subjects.

Hanne was a student who quickly expressed her confidence both socially and with regard to disciplinary achievement. "It was actually okay", she said about the transition from primary to lower secondary school. In regard to her grades in different school subjects in December first year in lower secondary, she said: "I actually saw that this was not as difficult as I had anticipated". When she started upper secondary, she also liked the new school and the school subjects. She was happy with both mathematics and L1, and she could see the connections between what she had learnt in lower secondary school and what they were now studying. She was an insider; she expressed an identity of inclusion in both subjects.

In Norway, students are not graded at primary school, but there is an ongoing debate regarding whether we should. (In assessing students in lower secondary school, year 8-10, and upper secondary school, year 11-13, we use the grades 1, fail, to 6, excellent). Based on what

Hanne had said earlier in the interview, she was asked for her opinion about grades in primary school. She said: “I think grades make you think more about the number [1-6] than about what you actually do and in what area you can improve”. She undermined the testing pressure from policy and displayed a strong identity as an active learner and participant in the subjects’ discourses. She not only obtained good grades, she also talked about school subjects and learning in general as an insider. When talking about L1 first year in lower secondary she said:

> I remember it was lots of new stuff, but also that we built on things we had had earlier, so I found it okay. However, at the same time we learned to write a lot. […] I felt I learned a lot, and it was not as different as I had expected. […] I find writing exciting, but teaching from the board, I don’t fancy that much. I like writing and to learn from the feedback I get from the teacher; however, one ought to have some teaching from the board as a supplement. I think it is useful when the teacher, for example, gives me feedback on grammatical errors. Then I learn it.

Knowing what she liked and how she learned, Hanne displayed a meta-perspective on her learning. She seemed confident, was inside the L1 discourse and was aware the terms and rules, especially for that subject.

When talking about mathematics in lower secondary, she expressed the same confidence. As in L1, she was acquired into the discourse and thus in a learning process (Gee, 2012). When talking about mathematics as a school subject, Hanne displayed awareness concerning everyday language and mathematical language, and she showed command of different mathematical genres:

> Algebra, I remember very well, because that was something new in lower secondary. I remember I did not understand anything, so I did many tasks. It took lots of time, and all of a sudden, I understood it all. […] I felt happiness then. It was minus and plus that were not correct, but suddenly I saw that there was a relationship.
>
> I don’t remember that we had much probability, we did not have union and intersection, but we had like having a box with three blue balls, and what is the probability drawing a blue one? We did not use many mathematical expressions but we calculated. And geometry I remember, it was quite new in lower secondary. I remember we had to do a lot on each task, but after a while I liked it. .

She knew the terms and rules which are prevalent in the mathematical discourse. She knew when she was in a learning situation and how she was learning. Being successful was part of her identity, both in lower secondary and also now in upper secondary, when the majority of her classmates were also successful students.

Tim had a minority language background. Because of his good grades from lower secondary school, he was accepted at School A. He said that in lower secondary he was considered one of the smart ones. However, now he had to work more in order to maintain his good grades. When talking about the transition from primary school to lower secondary, he shared his reflections as a student in the school system. He thought that too much of school mathematics in primary school was about skills and solving tasks more or less mechanically, and not learning to think mathematically. However, when starting lower secondary they had used mathematics in new and different ways.

> T: In mathematics, you then needed a creative solution and you needed to use your brain individually and to think about other ways to solve the tasks. I don´t think most students were used to that, because [in primary school] there was always adding up tasks four plus four; you only got tasks you could solve algorithmically. I think that was a challenge.
>
> I: The mathematics teaching in class, any difference there?
>
> T: Yes. On the other hand, I think it was challenging, or different. Different curriculum. In addition, I did not understand the logic behind algebra. I asked why- questions about it. I think the teacher rather should have started a new chapter systematically: 'today we shall learn this'. The 'a' and the 'b' in algebra, they are not just numbers. They signify something. [ ]
>
> I: So algebra is the difficult one?
>
> T: Yes, I don't think they understood the logic. It was just cramming and memorising facts.

Tim's focus here was on his struggle to be included into the mathematical discourse, its logic and modes of thought (Bruner, 1986). The transition from the routines in primary school, with its focus on skills and mechanical tasks, to the requirements for mastering mathematics in lower secondary, demanded a change in his relationship with the subject. He was aware of this but, as his statement about algebra reveals, was still struggling with what the letters in algebra signify.

Tim was in a learning situation, but he experienced that many of his classmates in lower secondary were unable to maintain the high standard. Additionally starting with Norwegian in lower secondary was demanding, or rather confusing, for Tim:

> I must say something. Although having lessons and learning a lot, I didn't always know what we were actually doing. In math it was like, now we are working on algebra. It is very important for students to know where we are. In science we learned about our body or health, and in cooking about carbohydrates. But in Norwegian I did not know where we were. What are we doing now? Are we working on the Viking period, the sagas, or did we do writings or having about essays, or…

Tim shared his educational struggle and trying to understand the complex and multiple hermeneutic subject, L1. He searched for meaning, but did not find the relationship between the different activities. They were not sufficiently connected in order to create meaning for him. He expressed a comparison of the different subjects' genres and activities and a scepticism towards skills and cramming.

Nora was a happy student in School A. When she started lower secondary and having her first grades, her average was 3.6 (on a scale 1-6 where 6 is the highest). Towards the end of 8th grade her average was 5.2.

She was asked whether she started between 3 and 4 and ended up between 5 and 6 in mathematics as well:

> N: Yes, I did. I worked hard and practised. I remember that on the first math tests I did not manage to answer many questions; however, towards the end of 8th grade I could do them all.

Nora was active and ambitious. In regard to her current mathematics in upper secondary she felt, however, slightly behind and often lacked time to focus on a chapter before they were tested in it.

> N: It goes a bit too fast, and there are the other subjects too. So, I haven't got that much time for mathematics.
> I: Any particular areas in mathematics you feel are too fast?
> N: […] may be functions, graphs and stuff, and derivation for example.

Nora was aware of her own learning and educational situation. Through understanding the need for time and highlighting different genres, she told about her challenges in learning mathematics. She was an insider. Her knowledge from lower secondary about equations had been helpful in her learning process in upper secondary.

> N: We thoroughly went through it [equations] in lower secondary, so when I first came here, I knew it very well, and I was quite okay. [ ]
> I: And the tests in mathematics, how do you find them compared to in lower secondary?
> N: A little more challenging and little more creative tasks that make you having to think more. I was used to more simple and straightforward tasks [ ] and now we get a long problem, and I become more confused with regard to what to do and how to do it.

This emphasises Nora's meta-awareness of the nature of school mathematics in lower secondary compared to the demands she now faced in the subject. Her mathematics identity

mirrored her consciousness of difficulties, but also an insider who had a meta-perspective on her own learning process. Although communicating some difficulties, she was within the mathematical discourse.

School B

Now the three students Julie, Samid and Peter from school B will be presented. They were selected here because they typified the difficulties in learning and lack of meta-awareness which were typical for the majority of students from this school class.

Julie was frequently absent from school and had poor grades in all subjects. Mathematics was her most troubling subject.

I: If we think of *lower secondary*, and we compare mathematics and Norwegian, can you explain the differences and similarities between the two subjects?
J: It was quite cosy to be in Norwegian lessons, it was rather cosy - and a nice teacher.
I: And mathematics?
J: It was also okay, but we went through things so fast and really, yes, there is not much to say about it ... I liked … to be there ... and I should really have put me into mathematics, because mathematics is like you really have to sit and think before you understand ... it's hard … the subject is … yes, difficult.

As this small excerpt from the interview shows, Julie was neither thinking nor responding as "a learner" in any of the subjects, and she did not display any meta-perspective.

On the question about disciplinary differences between the two subjects L1 and Mathematics, she answered from her everyday discourse - where it was most cosy to be. She had not been there to learn, but to keep “cosy”. Mathematics was hard and difficult and “you have to think”. She did not use mathematical language. She was not inside the discourse and therefore not in a learning process.

When being asked if she remembered anything special (literature) they had read in L1 in lower secondary school, she could not remember any particular texts.

I: Do you remember how you were working with literary text …You read aloud maybe?
J: Yes, we read aloud, and when we sat reading, I always thought ... please don’t let me be the next to read! The class was like ... some commented very much when you read, so I did not like to read in class. [...]
I: What in Norwegian did you find least meaningful?
(A long pause)
J: When you sit in class and do tasks you actually do not understand why you have to do them. For example, having read the text and spent much time on it, and then you have to answer many questions about it. I think it’s pointless,

because if you understand the text, then you ... so you understand it somehow ... [...] I think it's better just to talk about it.

On questions about learning, she replied as if she was asked about how it was to be part of a group rather than a learner. She was not an active learner, and not inside the disciplines, though not knowing what it was all about. She did not, for example see the difference between reading as a skill and reading for the purpose of interpreting a literary text, the latter being at a meta-level.

Julie was neither inside mathematics nor L1. Mathematics was “hard and difficult”, in Norwegian, it was “cosy”. Her institutional identity was weak, and her emotions in the context were dominating.

I: How was it to begin in upper secondary school?
J: It was difficult, very difficult. They jumped straight into the subject. So fast. In lower secondary, we spent some time learning one thing, but here we spent one day and then we have to be there. So, the first year has been difficult. The teachers keep moving on - yes – even though I do not understand it yet. They go very fast from one thing to the other.
I: What about your grades?
J: No, it is not going well. No. Since there was so much stress, and there was so much to do. When we learned about five different things in different subjects, which were all mixed up, it was just chaos.

Julie´s emotions and everyday discourse characterised her stories. Her grades were poor. It was still uncertain if she would complete upper secondary school.

Samid (from a minority language background) was doing better than Julie in some subjects, but his future education was still uncertain. He was doing reasonably well in mathematics. His grades, however, were low (3 or below) in all subjects. L1 was his most problematic subject. He preferred mathematics saying “in mathematics there is one right answer, whereas in Norwegian you may answer in different ways".

I: If you think of the textbook in mathematics and in Norwegian, how do you work with these two books?
S: In maths, the book is clear and orderly. You always know how to use it, and the tasks are clear so that one can try out, practise the tasks [...]. In Norwegian, it is completely different answers. You can reply in different ways. In mathematics there is only one answer.
[...]
I: What did you learn from Norwegian textbook in lower secondary?

S: There were so many texts, a lot of different texts. Then there were some facts about different things.
I: Do you remember anything you learned?
S: Yes, I learned if it was explained to me, for example genres.
I: How did you use the textbook? Did you use it mostly to look up, to find the information you needed, or did you read it more systematically?
S: It was mostly to seek answers, I think. That is what I remember best.

Samid neither knew what the subject was about, or that L1 is based on a different mode of thought and reasoning than mathematics. In mathematics a paradigmatic mode of thought involves generalisations based on proofs following specific rules. Samid used this mode of thought as criteria for meaning also in L1. He did not consider the L1 discipline as a hermeneutic subject. He used the textbook as he did with his mathematics book - "to seek answers", and not to interpret a text. He was not the active and questioning student needing to be in order to interpret and seek meaning in L1 texts. What he remembered from the textbook was “for example genres” and “some facts about different things”.

I: What about your attitudes towards the subjects Norwegian and maths, has it changed from lower secondary to upper secondary school?
S: No.
I: There is a lot of literature in Norwegian. Do you remember some of the literary texts you have read?
S: No, I do not remember.
I: Can you tell us what you do with these texts and all that?
S: Yes, we must analyse and explain things.
I: Yes, do you find it difficult?
S: Yes, you have to read it thoroughly before the lesson. [...]
I: So what you are doing now is more difficult?
S: Yes, it is difficult.

Samid was doing better than Julie because he expressed an interest in mathematics. However, the above excerpt indicates that he did not understand the L1 subject, which he approached with his mathematical ways of thinking, (“only one answer”). As with Julie, we suggest that Samid would also need help from an expert teacher in order to take part in subjects’ discourses and to learn how to use what Bruner (1986) calls the syntagmatic mode of thought. A focus on basic skills may not lead to learning. However, in order to develop meta-awareness in the two subjects, both discourse and modes of thought must be made explicit for him (Kleve & Penne, 2012).

A third student in the same class, **Peter,** expected to pass his examinations, although his grades were below average. However, that was not so important for him, because Peter’s

dreams and interests were related to sports. Prior to the following excerpt, he had just stated that he did not like the L1 subject, including New Norwegian, which is an official second language in Norway.

I: Can you tell why?

P: Yes, first there is the need to write a lot, and read texts and stuff … [...] and then there is New Norwegian. Everyone hates New Norwegian, don´t they? All students in the country must hate it.

I: But what about maths? Do you like that?

P: Maths is perhaps the most boring school subject ... you have to work a lot to keep up with it. It is not like the other subjects, it's a little different.

I: How do you cope with it?

P: It's okay if one just manages to stay awake during lessons.

Peter's affinity aspect of identity (Gee, 2001), was strong while his institutional identity was weak. He expressed the idea of mathematics being "a little different" from other subjects. However, he talked about mathematics in passive terms and from his emotional or affinity perspective (Gee, 2001). Mathematics was boring and the only challenge was not to fall asleep during the lesson. His utterance about New Norwegian, shows that he based his generalizations on his own feelings in the moment. He was neither included in, nor taking part in, the institutional discourse, or the disciplinary subjects' discourses.

I: Do you remember something you've read in your Norwegian classes?

P: Yes, the worst was perhaps what we have had now: Norse mythology and then a test. Everybody was stressed, and everybody went down at least one grade.

I: The teacher was too strict then?

P: Yes, but it may have something to do with that particular topic.

I: Was it because it was so boring?

P: Yes, I think so, and it was difficult. There were lots of names and so many old things to remember. This theme is a bit out of date, if you ask me.

Peter did not respond as a learner. He knew nothing about there being a particular purpose to the Norwegian subject. His everyday language, about what you think and believe here and now, mediated his answers. As an example, he described an interesting story about what happened when the teacher taught students about Norse literature and exposed them to a test three weeks later: "This theme is a bit out of date, if you ask me."

I: The textbook you had in lower secondary, do you remember some literature from there that you liked maybe?

P: No, I can’t remember.

I: Do you remember something that in some way was helpful to you?

P: No, I can’t really remember very much from that book. I'm not sure if there was anything special in there.

Equally, Peter did not remember anything from the textbooks, he expressed no interest in them and found them largely meaningless. This emphasises his strong affinity identity, and his weak institutional identity.

The students from school B met the school’s challenges with their primary discourse; their identities as students seemed weak. They displayed varying motivations for the subjects, and differing prior understandings and degrees of meta-perspective in the learning contexts. These features were typical for the students in this school.

Our analysis of these students’ stories indicate that their learning could be enhanced through participation in the subjects’ respective discourses rather than focusing on basic skills. Meaning making and learning are closely connected.

5. Discussion

Through the interviews we found a striking difference between the students from the two schools concerning their meta-awareness and their identity as students – their institutional identity. These aspects are closely related. When students are actively learning, their modes of thought are changing and, consequently, their mediating language. The most successful students, exemplified here with Hanne, Tim and Hedda, explained their learning on a meta-level.

Students with less success did not explain their challenges in the same way. Most of them simply described how difficult they found the subjects which they did not understand. Some answered by expressing their opinion of the subject. They found a subject boring or unnecessary. In addition, there was a general pattern that the majority of these students experienced the transition from primary school to lower secondary school somewhat dramatic, particularly receiving grades for the first time. They did not understand why they got such low grades or what could be done better. They were not inside the subjects' discourses and ways of thinking - they did not have sufficient prior understanding. Most of the students from school B, here exemplified by Julie, Samid and Peter, expressed uncertainty, ambivalence or indifference in regard to their institutional identity. They met the school requirements and activities with their everyday language – their primary Discourse

(Sfard, 2001a, 2001b; Gee, 2012), including simplifying antitheses, more subjective and often narrative representations (Bruner 1986, 1991). The use of their primary Discourse was clearly stated when they were explaining their learning in school - how they learned or did not learn the two subjects. This was particularly noticeable with Julie. Samid expected specific answers in L1 as in mathematics, thus not seeing any differences between the two subjects. Peter's strong affinity identity overwhelmed his role as a learner, and he did not find any meaning in school activities. He may be seen as an example of what Twenge (2006) calls "Generation Me", the consequence of an increasing focus on individualisation in the 21st century.

6. Learning subjects - being outsiders or insiders in the disciplinary discourses

As mentioned in the introduction, we live in a time when educational policy puts increasing weight on basic skills and testing. Findings from this study suggest that participation in the disciplinary discourses mediated by linguistic awareness is crucial for students' learning. Similar findings are reported in other research. One example is Shanahan and Shanahan´s (2008) study. They claim that a focus on basic skills may be good for learning in lower primary school, but in middle school or upper primary the different subjects must become more visible. Basic reading skills do not automatically develop into more complex skills that enable students to deal with the specialised and sophisticated reading of literature, science, history, and mathematics. "Most students need explicit teaching of sophisticated genres, specialized language conventions, disciplinary norms of precision and accuracy, and higher-level interpretive processes" (p 43). They argued that a focus on basic skills obscures disciplinary literacy. Similarly Sfard and Cole (2003) considered what a school can do in order to increase students' access to less familiar discourse and suggested a possible way of lowering the bar to the mathematical discourse for the less successful ones. They warned against "school learning which often leads to mathematical discourse that remains encapsulated or separate rather than playing the subsuming role in the overall repertoire of mathematical discourses" (p.12). Thus they concluded that "the ability to deal with abstractions and symbolism with rigor should be viewed as a vital part of mathematical literacy in modern societies and should by no means be barred from schools and made the privileged domain of elite experts" (p.1).

Through the analysis of the data here, a significant distinction was found between the students from the two schools concerning their institutional identity (Gee, 2001). The students from school B were not inside the subjects' discourses and ways of thinking (Bruner, 1986, 1990;

Gee, 2012). Consequently, they did not understand when the subjects gradually became increasingly complex. When Julie was asked what she found least meaningful in L1, she answered that when you had read a text you should be finished. “Answering many questions about it”, she claimed, was pointless. “I think it's better just to talk about it”, she continued. Julie could read the texts - she had no problems with basic skills - but she did not see the point in contextual interpreting. She wanted to talk about it through her primary Discourse (Gee, 2012).

The students from school A explained their learning processes logically and systematically on a meta-level. They described the work, the effort they needed in order to understand and gradually comprehend the two subjects' discursive meaning. They explicitly expressed pleasure when ‘succeeding’ and understanding the subjects.

Solomon and Croft (in press) question if and how university could reverse the effect of alienation from mathematics that students had from earlier schooling. In the same way as they warn against a focus on mathematics as a “series of tricks” (p. 9) both in school and later at university, we suggest that focus on basic skills will not solve the problems for those who are not included in the subjects’ different disciplinary discourses.

7. Conclusion

Students explain their learning in subjects differently. In this study successful students displayed a meta-perspective and explained their own learning as insiders in subjects’ discourses. The less successful students’ stories were characterized by their everyday discourse and emotions, they found the subjects more or less meaningless and they had a weak institutional identity. They were outsiders. Findings from the analysis suggest that inclusion and participation in a subject’s discourse are crucial for learning.

Institutionalized goals, performance and testing of skills are dominant issues in the field of education (Meyer & Benavot, 2013; Sawyer & Van de Ven, 2007; Shanahan & Shanahan, 2008). These are very demanding of the resources within current educational development and research. The problem of creating good possibilities for all students’ inclusion in disciplinary discourses is thus obscured. This is an important area for further research.

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