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### ► To cite this version:

Anette Bagger. ”It is only a test”-social aspects of displaying knowledge in mathematics for second language learners. CERME 10, Feb 2017, Dublin, Ireland. hal-01937450

**HAL Id: hal-01937450**

**<https://hal.science/hal-01937450>**

Submitted on 28 Nov 2018

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# **“It is only a test” – social aspects of displaying knowledge in mathematics for second language learners**

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*This article discusses social dimensions connected to assessment in mathematics for second language learners in Sweden. The data consist of two semi-structured interviews with students in the ninth grade of compulsory school. Foucault’s thinking on discourse and positioning was advocated as a frame for analysis. The units for analysis were students’ statements about caring and the other in connection to the display of knowledge in mathematics. Results show that caring of and for others are important resources in managing assessment and believing in the future.*

*Keywords: Second language learner, assessment in mathematics, opportunity to display knowledge.*

## **Introduction of the problem area**

Measures of achievement are often situated as measures of quality in education (Lundahl & Tveit, 2014) that promote striving towards high quality, yet also threaten equity at times (Llewellyn & Mendick, 2011). An example of this are recent educational reforms including earlier and extended testing in Sweden (Regeringen, 2006). These reforms have led to an enhanced focus on the measures of knowledge, while at the same time school agencies generate reports on inequalities in the measured knowledge and grades in mathematics between schools and groups of students. Differences are connected to gender, class and ethnicity (e.g., Skolverket, 2015). Achievement in national tests is central in grading as the results of the national tests in mathematics often are used to indicate students’ grades (Skolverket, 2016). Not having an approved grade in mathematics at grade nine in Sweden means that a student does not have access to public programs at the upper secondary school in the following year. The opportunity to display knowledge then becomes a critical point of departure for the individual’s possibilities for positive development and positioning in mathematics. This turns the assessment grade in mathematics into a gatekeeper to get access to higher education, and is a gatekeeper that keeps out second language learners (SLL) more often.

This portrayal of circumstances alludes to societal, historical, social and political discourses influencing an individual’s mathematical development and life-choices by making some positions available and other positions not available. Researchers are currently engaged in issues of for whom education functions and thereby which students can have access to success in education and life (Au, 2008; Peters & Oliver, 2009). The focus on disadvantaged groups of students then affords new ways of understanding and approaching mathematics education (Gutiérrez, 2013). Alternative ways of relating to and understanding assessment are needed and in this, listening to the students as opposed to only labelling them, are of core importance (Hodgen & Marks, 2009). Research that is paying attention to students’ stories also contributes to knowledge about the lived and social dimensions of assessment that needs to be paid attention to according to Black and Wiliam (2010).

In this article, I strive to recognize and study the production of (in)equity in connection to grading and national assessment in mathematics. I highlight aspects that might be foreseen in the general debate and work in the area of mathematics education. Through this, I contribute to the identification of possible resources that could promote paths for increased equity. In regard to the concept of equity,

I draw on Boaler's (2006) concept of relational equity. In a school where participants (do not) learn to respect differences and each other in the mathematics classroom, relational equity is (not) lived and taught. This understanding can be applied on both the micro-, meso- and macro-levels of education and opens up studying equity beyond the gap-gazing of diverse achievement levels in mathematics (e.g., Gutiérrez, 2008; Rodrigues, 2001) something that actually might counteract equity and hold disadvantaged groups of students behind (Gutiérrez & Dixon-Román, 2011). Following from this point of departure, resources for producing equity are to be found in lived, diverse, relational and social aspects in the process of assessment and displaying knowledge. I contribute to the identification of some of these resources through the study of social and relational aspects connected to assessment and the opportunity to display knowledge in mathematics for SLL. In this paper, I specifically contribute to the act of listening to and exploring experiences of students within subordinated groups by highlighting experiences of SLL in connection to displaying knowledge in mathematics. The purpose of this paper is to contribute to knowledge about social dimensions of displaying knowledge for SLL in mathematics and how this can be related to future prospects connected to the subject. The investigation examines three research questions: Q1) How do statements about the other and caring appear in talk of displaying of knowledge? Q2) How do statements about the other and caring appear in talk of future prospects connected to the subject? Q3) What discourses are activated and what positions are available in the students' talk? Here, caring refers to both care for oneself and for/from others.

### **Theoretical framework**

A statement works as a mediator of knowledge and truth that exists in a field of power-relations and is embedded in discursive formations with other statements (Mellvenny, Klausen & Lindegaard, 2016). Discourses are understood as governing and positioning individuals through power and knowledge (Foucault, 1994), and positioning is understood as "the discursive process whereby selves are located in conversations as observably and subjectively coherent participants in jointly produced story lines" (Davies & Harré, 2001, p. 264). Therefore, analysing students' statements will reveal discourses that are activated in connection to the display of knowledge and assessment in mathematics. In order to capture social aspects of displaying knowledge in mathematics, the role of *others* and *caring for/by others* are used in this project (Black, Solomon, & Radovic, 2015). Black et al. (2015) have shown that these phenomena may be powerful cultural resources in shaping a positive identity in mathematics. Black et al. (2015) have drawn on Bakhtin. Instead, I use the concepts as signal-words, which reveal the representation of a social and lived aspect of displaying knowledge in mathematics.

### **Method and selection**

This paper presents the analysis of two interviews with SLLs. Their names are fictional. Amina and Ahmed are 15 years old and have both struggled with their learning in mathematics since third grade. They did not pass several of the goals in mathematics in their third and sixth years and have had special support during this time. Amina achieved the lowest passing grade (E) in her ninth grade and was given support in the form of special instruction. In the ninth grade, Ahmed did not receive any special support or adaptations in mathematics and got a D, which is the average grade. The data were collected right before the final choice of program to the upper secondary school was made and the final grade in compulsory school was given. Amina and Ahmed had just finished their last national

tests in mathematics. Interviews conducted on this occasion were assumed to contribute to a concentration of their experiences of displaying knowledge and assessment. This selection of students is meant to bring specific questions concerning assessment in mathematics for SLLs into the forefront.

The interviews were semi-structured. This approach was used to promote the student's possibilities to talk freely and to display as much of their understanding and experience as possible (Kvale & Brinkman, 2014). The students could talk about anything they chose in the areas of support, assessment, national tests, grades, mathematics and the future. For the most part, I asked open-ended questions to follow each theme. Questions were, for example: why do you take these tests; what did you think/feel; did you talk about it to anyone and how; was it possible to get help; if so, how? These open-ended questions were followed up with more specific questions connected to what the participant had expressed, in order to get as good an understanding of and rich information about their experiences as possible. The positions and activated discourses were constructed through analysing statements about caring and the other in the context of displaying knowledge in mathematics. Key markers in students' talk were statements involving others as for example peers, friends, family and school-staff and statements regarding caring about or being cared for by others. These statements also had to relate to assessment and/or displaying knowledge in mathematics. An interpretative reading of statements was done back and forth in order to identify the discourses and positions involved. For this purpose, an adaption of Foucault's (2011) description on how to find discursive formations was used: 1) First, statements regarding caring and others were identified. 2) Secondly, the form of these statements was described. 3) Thereafter, the relations between these statements were described and the correlations and contradictions between these statements were explored. 4) Then, the statements were grouped and the correlations and contradictions between these groups were explored. 5) In the final step of the analysis, the discourses were construed.

### **Ahmed and Amina: Interview data**

The interview data connected to the first two research questions are presented here. This presentation derives from the first four steps of the analysis. Overall, these statements concerned family or peers, and notably teachers were not mentioned at all in connection to statements concerning caring and the other.

### **Statements about the other and caring in talk of displaying of knowledge**

The students talked about care of and from others primarily in relation to peers and as peers as a point of reference for the achievement or possibilities to succeed. Ahmed mentions that the girls talked about when the tests were, and, in a way, that could make each other nervous: "The girls are like: it is mathematics (national test) tomorrow, tomorrow! They mentioned it several times" (transcript 005). But he was not nervous himself but rather preferred to take it all in time and put the test into a larger context of living: "If I make it, I make it... There is no point in worrying, life will continue anyway" (transcript 005). Even if he was at ease, he expressed concern about a friend who did not manage Swedish well enough in relation to the support given and the construction of the tests. The friend was very good in mathematics in his homeland but after coming to Sweden he almost did not pass: "He is not so good at Swedish so he thought it was a Swedish word he asked for help with. The teacher could not do anything but read it aloud again. In his homeland, he had like a high grade and here he barely passed" (transcript 005). Ahmed talks about care of himself in relation to effort and

outcome on the tests: he is at peace himself with not being able to solve all the tasks, since they are constructed for all levels of difficulty. This circumstance also makes it hard for him to know if he passed the test, “I might think it is hard but I am on an E, the ones being on an A may not think it is so difficult. So, I would say it was ok, even if it was hard for me” (transcript 005). In this way, Ahmed refers to peers as a point of reference. Ahmed says that he made a deliberate choice not to study before the test: “I have myself to blame if it went bad, I accept my choices” (transcript 005). Amina talks about care of herself in relation to her knowledge in the subject, her effort and grades. She thinks mathematics is hard but does not think the grades reflect her experience of the subject as interesting and of herself as someone who is interested, learns and works hard: “I think math is easy, or easy, it is hard but I think it’s fun. What comes out shows in the grade... I put a lot of effort in math but I do not get good results. It does not show in the grade. It makes me feel disappointed, but at the same time it challenges me” (transcript 002).

### **Statements about the other and caring in talk of future prospects**

The students’ statements regarding the future prospects are often connected to the family’s care about them. Both students expressed that parents and relatives had high expectations and beliefs in them and their engagement in mathematics. Amina connects the big expectations she has for herself to her parents’ expectations: “I think my expectations come from mum and dad, they expect big things from me” (transcript, 002). The family stressed that they should do what they could to enter upper secondary school. For example, if Ahmed did not get the lowest approved grade, the family would encourage him and not let him give up: “They would be grumpy with me and they would think that I should go back and keep on fighting and not stop” (transcript 005). In particular, Ahmed’s brothers had given him advice on how he should choose a program at the gymnasium in relation to mathematics and also had given him a good trust in upper secondary school, the mathematics involved in the program he chose and the teachers: “I have lots of expectations since I have a family from whom I have taken like a lot of advice. All have said very good things about the school and the one (brother) who studied construction has said a lot of good things about a teacher working there” (transcript 005). He also compared and talked about his siblings and how they succeeded and what they had done in their time at the upper secondary school: “You know, my brother, he says that there are three days of practice a week and that you get to learn a lot out in the field. Three weeks before finishing school he was offered an employment... He is 19 and he has a job” (transcript 005). Motivation was in this way connected to talk about parents’ and relatives’ anticipation of and belief in them and their engagement in mathematics. Although Ahmed could feel that they nagged at him, he understood and appreciated the advice to put effort into the learning in mathematics: “I understand their arguments and so and I really appreciate that they help me there and I understand the point. It seems to be important to get a grade in math” (transcript 005).

### **Statements about the other and caring in talk of future prospects**

Care about themselves in connection to the future were expressed in relation to belief, struggle, worries and seriousness. Ahmed worried about the test a great deal afterwards, if some of the harder tasks would deprive him of his grade, his time in the upper secondary school and stop his journey in life and companionship with friends: “This is life, this is it. I would be very disappointed if I did not pass. Then I will miss a whole year... I do not want to wait a whole life for life to continue” (transcript 005). The students meant that future choices may be limited depending on their knowledge, which

made them both choose a program at the upper secondary school with a low level of mathematics. Statements about expressing care for others concerned peers and primarily gatekeeping functions in the assessment in mathematics, but also their own learning in positive anticipation regarding their ability to develop. Amina talks about her peers as participants in discussions about the grades, something that has been intensified over time as it is connected to mathematics as the gatekeeper to the upper secondary school: “We did not talk as much about it (earlier) but more later. That it is the grades that decide if we get into upper secondary school” (transcript 002). Here, Ahmed points towards the gatekeeping function in the national assessment of mathematics, which is worrying: “If you fail in math, then you are done... That is why I have been lying awake at night and thought about the test” (transcript 005). Both students anticipate that math will be hard in the upper secondary school but they are confident that they will learn. Amina says she is eager and ready to take on the challenge: “I am going to study at the upper secondary school and I have to be prepared that mathematics is the hard thing. I am very excited” (transcript 002). Both Amina and Ahmed are very confident that they can learn the mathematics they need when they finally begin the upper secondary school. Ahmed for example states “but I think that when I finally go to the construction program I will learn it, how to count with area and stuff” (transcript 005).

## Analysis

The analysis answers the third research question and explores the discourses that are activated and the positions available. A *discourse on managing assessment* (connected to statements about peers), a *discourse on progress* (connected to statements about family), a *discourse on future challenges in mathematics* (connected to care about oneself) and a *discourse on fairness* (connected to care about oneself), were construed from the analyses of statements connected with *caring* and *the other* in connection to displaying knowledge and mathematics. The activated discourses led to some available positions for the students.

*The discourse on managing assessment* concerns support, comparison and monitoring of support, grades and tests. Ahmed talked more about his peers and talked overall more than Amina. Amina referred to peers as a help in focusing on the grades and Ahmed expressed care for others. He then positioned both himself and his peers as *disadvantaged test-takers* due to language and the settings and construction of the national test. He also positioned girls as more nervous in their monitoring of test occasions.

*The discourse on progress* circles about responsibility, advice and expectations stemming from the families. Expectations were then blended with demands on focus and progress. *Hard working* and *you can if you want to* were positions connected to the family discourse. These positions had connotations of personal responsibility, achievement and future prospects.

*The discourse on future challenges in mathematics* held statements in which caring about oneself was connected to a position in which limitations in knowledge blended with striving to learn and the outcome that learning was to be conquered.

*The discourse on fairness* connects the student’s individual responsibility, effort and knowledge to the achievement and assessment in mathematics. If the effort is made, the knowledge should be retrieved and following from that, the grades should be accordingly high or low. In *the discourse on future challenges in mathematics* both students positioned themselves as capable of trying and

working on improving, although within certain limits. A position of *struggling while learning* was identified, this position is possible to connect to the *hard-working* and *you-can-if-you-want-to* positions in various combinations. In *the discourse on fairness*, a position of *choosing your achievement* was shown in Ahmed's talk as he chose not to study and accepted the consequences. Amina also spoke out from a discourse of fairness as she questions the grade, and that the hard work should have been seen in the grade. At the same time, she capitulates and says that it is hard for her to learn and remember for example the methods to use – so the grade may be fair after all. This could be described as a position of *being unable* to succeed.

## Discussion

The semi-structured interviews contributed to a trustful and open climate for conversation. This made it possible for the two students to display important social dimensions of displaying knowledge and learning mathematics. One example of this was when Ahmed talked about how his brothers and family supported him: “I took their advice... It seems to be important to get a grade in math” (transcript 005). This happened on an occasion when he was actually skipping school for a day and hanging out with his brothers. This occasion proved to be an important moment in his positioning as a mathematics learner. The main concepts in the analysis were statements about *the other* and *caring* (also see Black et al., 2015). In many ways, it is possible to assume that there are many differences between Roz, the adult mathematician in Black et. al.'s (2015 study and the two students in this study when it comes to opportunities to learn and display knowledge. What they have in common is that the female mathematician and immigrant students are groups both governed by different types of gatekeeping functions in their access to the subject. Interestingly, the same socio-cultural resources as found in Black et. al.'s (2015 study, seem to work well in illuminating prerequisites for a positive development of identity in mathematics among students that have struggled with their learning. The statements about assessment in mathematics and the future were in many ways a narrative drawing on the community of the family and the peers. This could be a sign that relations outside school, in families or between peers, are important resources in the building of a positive identity in and a relation to the subject mathematics.

Both students in this study were willing to learn and develop their skills in mathematics, although they knew that they were in some way limited because of their lack of knowledge at some times. Although struggling with mathematics, they still had a positive way of approaching the subject, which is not always the case for students in need of support in mathematics after nine years in school. The families' expectations and talk with their children about the future and the role of mathematics in it may have contributed to a discourse about struggling when learning. This discourse could contribute to a positive identity in mathematics rather than devaluing the struggling student as a learner in mathematics. This research contributes to knowledge about the social dimensions of testing for SLL. Social and lived dimensions of assessment may get lost in translation if the measures on achievement are interpreted without taking the social, cultural, political and relational contexts into account. Conclusions from assessment that mainly focuses scores and levels of achievement might reveal differences and tendencies of segregation or lack of knowledge but without affording means to counteract these inequalities. Therefore, more research in the socio-political area of mathematics education is needed. This paper joins the socio-political research in mathematics education as I contribute to knowledge about social dimensions of displaying knowledge in mathematics for

disadvantaged groups of students. The aim was to identify valuable resources in providing access to and success in mathematics for all students. I also emphasise an alternative way of understanding assessment beyond measures of knowledge and quality, namely as a means of promoting social and relational aspects of becoming more mathematically able. Since, as the students' statements revealed, it is (not) only a test of knowledge but also an occasion of caring about oneself, caring for others, and being cared about by others.

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