European Journal of Special Needs Education

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/rejs20

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To cite this article: Anette Bagger (2022) Opportunities to display knowledge during national assessment in mathematics: a matter of access and participation, European Journal of Special Needs Education, 37:1, 104-117, DOI: 10.1080/08856257.2020.1853970

To link to this article: https://doi.org/10.1080/08856257.2020.1853970

Published online: 01 Dec 2020.

EUROPEAN JOURNAL OF SPECIAL NEEDS EDUCATION
2022, VOL. 37, NO. 1, 104–117
https://doi.org/10.1080/08856257.2020.1853970

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Opportunities to display knowledge during national assessment in mathematics: a matter of access and participation

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ABSTRACT

Students with special educational needs (SEN) are systematically hindered in their participation in test-taking and, as a result, are also excluded from participating in high-quality learning. Hence, participation in the assessment situation is connected to power relations and future prospects and possibilities to participate in society. This article explores aspects of participation in a standardised and national assessment in Sweden by scrutinising a moment of mandatory national testing in mathematics with students in need of special education. The conclusions are that layers of access and levels of participation are established as the result of complex movements between communication, support, relations and the mathematics involved.

ARTICLE HISTORY
Received 01 Mar 2020
Accepted 11 Nov 2020

KEYWORDS
National assessment in mathematics; access; adaptions; participation

Introduction

Assessment challenges the values and goals of inclusive education and often leads to the exclusion of students with special education needs (SEN), whose participation both in assessment and education is challenged as a result (Slee 2018). Furthermore, there is a lack of research regarding these students and their participation in mathematics assessment. The present study contributes knowledge regarding some of the issues connected to participation in moments of assessment by following a nine-year-old student named Nora through the mandatory national assessment in mathematics in Sweden. I emphasise the student's participation in assessment as a result of the interaction among the teacher, the material, and the learning environment (see Jansson 2005; 2010). Furthermore, the test situation is understood to be fabricating the student and his or her knowledge (see Bagger, Vennberg, and Boistrup 2019; Popkewitz 2014). Fabrication is understood as a technology through which kinds of students and their participation is governed (Popkewitz 2013) and as:

> … practices about how to think about people, a way of acting on particular populations, and for people to act on themselves that excludes and abjects Table 1in the impulse to include. (Popkewitz 2013, 440)

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Table 1. Jansson's (2005) model of aspects of participation.

	Level	Type of participation
Advanced levels	6. Autonomy	Existential, to experience meaning
	5. Commitment	Psychological, to be motivated and make a good try
	4. Acceptance	Interpersonal, to accept to take the test
Basic levels	3. Co-action	Social, to be able to act and cooperate
	2. Access	Functional, to be able to access the content
	1. Belonging	Physical, to be included in the activity

This approach is derived from a discursive perspective on the tests carrying through as governed by a collective social epistemology (see Popkewitz 2014).

Hence, participation is understood as being imprinted by power relations and governed by prevalent global, national and local discourses on mathematics assessment and inclusive education. Therefore, participation goes beyond the actual taking of the test to also affect future prospects and participation in society. This article adds to calls for research that explores and promotes a more 'relational form of assessment-one that priorities listening to pupils and promotes learning rather than labelling' (Hodgen and Marks 2009, 41).

The purpose of this study is to contribute knowledge regarding how the participation of a student with SEN appears and changes during a moment of assessment. The study has been guided by the following research questions: (1) How is the moment of assessment experienced by the teacher and the student? (2) How does participation occur in the narratives of the moment of assessment? and (3) What level of participation might that represent? The levels of participation will be discussed in terms of the fabrication of the SEN student as a test taker.

SEN students and mathematics assessment

The neoliberal governing of education though assessment creates a tension between equity and quality issues (Bagger 2017; Dreher 2012; Plank and Condliffe 2013; Rizvi 2013). Slee (2008; 2013a) pointed out that the standards, testing regimes and performance rankings contribute to the exclusion and marginalisation of students. This happens through the labelling practices that follow the assessment of 'regular' and special' students, teachers or schools. The rationale behind these testing regimes also silences knowledge in inclusive education, knowledge that is important for the education of all students and is connected to a political disposition to exclude (Slee 2013b). Douglas et al. (2016) showed that despite an inclusive approach, the participation in national tests of students with SEN is troublesome at the level of school systems, due to tension between access and a narrowing down of the curricula. Also, Smith and Douglas (2014) claimed that it is necessary to critically revisit assessment policies that are driven by accountability, regarding how they impact on the possibility to evaluate SEN students' knowledge in a meaningful way.

There is a need to generate knowledge about assessment practices and how the data are actually produced (Creagh 2016; Stobart 2005). This is even more important today since assessment has moved from evaluating and measuring the quality of education to actually *being* education (Pettersson, Popkewitz, and Lindblad 2016). Excluding the value of some students, and their knowledge, means not recognising them as legitimate

mathematics students. Positioning of students' knowledge is related to relationships of power that affects an individual's possibility to participate in mathematics (Langer-Osuna and Esmonde 2017). Furthermore, educational assessment can be understood as totalising and individualising practices that, through 'games of truth' (Ball 2018, 83), reduces students to what Ball labelled 'economical subjects – subjects of value' (Ball 2018, 80), subjects that counts or not. This also, or maybe especially, applies to moments of assessment in mathematics.

Assessment in the subject of mathematics sorts and labels students, both at an individual level and a group level, through comparison (Boistrup 2017) and the socio-political dimensions involved create and recreate disadvantage and privilege (Lester 2007; Stobart 2005; Skovsmose 2005). There is scarce research on assessment in mathematics and the participation for students with SEN. A search in the educational database with keywords participation and disability and assessment and maths* in Eric generated only 20 hits within the last 20 years, only half of which concerned assessment in mathematics for students with disabilities. The purpose and focus often concerned whether students with disabilities attended and how that participation could be understood, or the number of students participating and how that could be increased (Bouck 2013; Goldstein and Behuniak 2012; Ketterlin-Geller 2005; Thurston et al. 2017).

There is a lack of studies on participation beyond taking the test. Specific disabilities have been investigated (Temple-Harvey and Vannest 2012), as has participation relating to accountability (Bouck 2013). Cawthon (2011) showed that accommodations and recommendations also depend on the subject being assessed. The study that has come closest to presenting a model or theory of participation was that of Universal Design for Learning (Ketterlin-Geller 2005), which highlighted meaningful participation and accommodations that improve results. Also, Schuelka (2013) confirmed the need to research participation beyond 'taking the test' and aspects of achievement, as these focuses mirrors a view of learning that devalues and promotes exclusion of the student with disabilities. In order to find further articles and to broaden the search, Scopus was advocated, with a limitation to the years 2015–2020. Evaluation was then added as a key term, together with 'special needs' or 'inclusive education'. This generated 10 hits. Participation or assessment of knowledge was not present in the articles as a main concern; instead, it was processes in inclusionary work or marginalised groups (for example, Hosshan et al. 2020; Norwich, Benham- Clarke and Goei 2020; Sharma and Rangarajan 2019).

Inclusive education and assessment practices in mathematics

Hamre, Morin, and Ydesen (2018) pointed out that there has been scarce research into the lived aspects of assessment. This topic needs to be explored through relational approaches and recognise experienced dilemmas and possibilities. Also, assessment practices are not value-free or independent of other ongoing discourses in education. Smith (2018) claimed that the Global Testing Culture (GTC) derives from a core assumption that test scores are valid measures of quality. The way in which numbers are used gives rise to a system imprinted by totalising and individualising assessment practices in education. These circumstances construct assessment in a way that places the effort, ability and outcome within the individual (Smith 2016). This feeds into the neoliberal

logics of choice and comparison and competition, something that Slee (2013b) identified as a threat to the education of all children.

Using these individualised and totalising principles (Smith 2018), assessment is not constructed as deriving from sociopolitical and cultural discourses that affect the setting of classrooms, schools and school systems. This collides with the international way of understanding inclusion, whereby schools are viewed as arenas for resisting and working for social justice and against educational exclusion (Slee and Allan 2001; Anderson, Boyle, and Deppeler 2014). Hence, the relation between inclusion and the neoliberal approach to educational quality holds tension and contradiction (Smith 2018). Smith stated that, in light of assessment practices, this tension leads to both immediate and long-term exclusion of students in need of support, but also core aspects of inclusive education. Behind this, according to Hamre, Morin, and Ydesen (2018), lie historical discourses of excellence and diversity that impact and define education, and also assessment, as they collide.

The Swedish context

The first step in a challenged learning process in Sweden is to adapt learning environments so that education is accessible and the student can participate (SFS 2010, 800). Students with disabilities have guaranteed access to the educational content through the Discrimination Act (SFS 2008, 567). Accordingly, if a student with a disability is not provided access to the national test, this is considered discrimination.

National assessment is mandatory in the pre-school class (six-year olds) and the third, sixth and ninth grades of compulsory school. All students take these tests, with a few exceptions; for example, newly arrived students are often excluded. The overall purpose of the Swedish national tests is to govern teacher's assessment of students' knowledge and secure equal assessment. Students' results are also used to measure of the quality and equity in education. There are national curriculum goals to achieve in mathematics for the third, sixth and ninth grades, towards which achievement on national tests are measured (Skolverket 2020). National tests in the third grade in Sweden consist of several part-tests, which the students solve individually and in writing. In addition, there is one part-test that is verbal and in which the students work in groups, although they are individually assessed. The tasks in all the part-tests are constructed 'to give students the possibility to display their capacity to explain and argue for their mathematical thinking' (author's translation, Skolverket 2020). Adaptions are allowed as long as they do not change the task in such a way that knowledge that was intended to be assessed cannot be assessed.

Material and selection

The data were collected in a larger ethnographical project following the implementation of national tests in the third grade during 2010 to 2012, in which 22 classes and eight schools were followed (Silfver, Sjöberg, and Bagger 2013; 2016). For this article, I draw on data from one of the classrooms. I spent 30 hours in the classroom before the test and became well acquainted with the class and vice versa. More specifically, I drew on data from one hour of highly individualised test taking with a nine-year-old student named Nora. Her participation was put at risk and the school attempted to support participation via adapted national testing. Three narratives represent this moment of assessment and

the experiences of it from the special education teacher and the student. The first narrative is a record of the test occasion, followed by a narrative displaying individual reflections on the recorded test with the special education teacher Karin and Nora. The reflections were collected in the form of individually video-stimulated recall dialogues (see Morgan 2007).

Ethical considerations have been at the core of this project. The combination of methods used, with moments of national testing being video-taped and the interest into students in need of support, contributed to a sensitive research setting (see Silfver, Sjöberg, and Bagger 2016). In this case, Karin's and Nora's consent to participate and to address or reflect on sensitive issues demanded a careful monitoring of power relations throughout the research process.

Nora has difficulty focusing, remembering and concentrating in the mathematics classroom and is often reluctant to do assignments. Nora sometimes works in the special education teacher's room with mathematics, where, according to the teacher and herself, she manages to participate. This is also written into her individual study plan as an adjustment of teaching. Importantly, this room is silent, with few objects and no other students in it, and Nora has an adult to support her with reading, writing, scaffolding and focusing. The team of teachers planned for Nora to take the test with this setting as an adaption since Nora essentially refused to take the test in the whole class. Nora had previously taken the test in the classroom along with the peers but was not able to produce answers in line with her knowledge in mathematics. Nora herself claimed that it is easier to work and concentrate, and more fun, in this withdrawal solution. Similar responses have been reported in earlier research on students' experiences of such learning settings, even though negative aspects or disadvantages have also been reported (Norwich and Kelly 2004).

Theoretical approaches

Langer-Osuna and Esmonde (2017) called for methodologies that promote powerful identities for all students. This demands that the methodology can unravel both the individual's experiences and the fostering of communities. The authors suggest that this might happen if narrative- and discursive-oriented research approaches are combined. Whilst narratives have the power to capture social meaning making and experiences of individuals, discursive theories might unravel structures at play. Hence, the theoretical approach in this study is three-fold: (1) a narrative approach, (2) a participatory approach, and (3) a discursive approach.

The narrative approach

Elbaz-Luwisch (2007) stated that teacher work and learning have a storied form. Narratives hold the potential to display lived experiences but need to be put into the context of the school and system. It is important here to recognise that the interviews and writing up of the narratives are points at which the researcher, teacher and student co-construct the discourse. With that said, narratives are not the object of analysis or outcome in this study; rather, they are used for representational purposes. The narratives were composed drawing on Mishler's (1986) explanation of a certain kind of narrative that

pays attention to the lived experiences according to their functions, context and consequences; in this case, regarding participation in assessment for a student who needs support.

The participation approach

As mentioned, participation is identified by the use of Jansson's (2005; 2010) model on aspects of participation. The model is in line with the World Health Organisation's (WHO) International Classification of Function and Health (ICF) framework (Socialstyrelsen 2020) since it is a biopsychosocial model in which activity in the lived situation is core and participation is understood as the outcome of the relations between context and the individual. In Jansson's model (2005; 2010), participation is categorised in regard to its function. The model has been developed to describe test-taking. The three basic levels are participation as *belonging* (when a pupil is considered to be a test-take), *access* (whether a student has access to the content) and *co-action* (doing what others are doing).

The three advanced levels can be conquered by the pupil, but only after the three basic levels have been granted by the school; namely, participation as *acceptance, commitment* and *autonomy*. Hence, if a student's autonomy or commitment is lacking, it is necessary to first determine whether the student is belonging, has access to the assessment situation and can co-act. The model makes it possible to scrutinise how participation does or does not take place in one individual's unique situation and lived situation (Szönyi and Söderqvist 2018).

The discursive approach

The assessment situation is explored from the understanding that tests carrying through is governed by social epistemologies, which is situated the historical, social, educational and cultural context at hand (Popkewitz 2014). The social epistemology fabricates kinds of people through processes of exclusion and inclusion that mediates knowledge and power that regulates what is desirable and possible (or not) for the fabricated kind of person. This double process of in(ex)clusion decides who are legitimate participants (Popkewitz 2013), while the 'norms for inclusion' simultaneously lead to the exclusion of certain types of student (Valero 2017).

Analytical procedure

Firstly, three narratives of the experienced and lived participation were constructed. Secondly, the level of participation was identified, using Jansson's framework (2006; 2010). Thirdly, the result was mirrored towards and discussed through the concept fabrication, drawing on Popkewitz (2014).

Narrative 1: national test-taking in mathematics

Karin begins by welcoming Nora and states that Nora's teacher thought that those two had worked well together and had asked whether Nora could take her test with Karin. Karin expressed how much she enjoys this, that they like each other, and that such an

arrangement will work well. She introduces some concepts: the equals sign and number patterns. The pencil breaks and is put aside, hidden behind the bear, and another pencil is used instead. Karin says: 'I will begin by giving you an easy pattern: 3, 6, 9, 12. What comes next?' Nora guesses 13 and looks and sounds proud. Karin gives her lots of praise and then quickly says: 'Now, I will give you something harder; are you ready?' Nora then replies, 'No' and Karin starts writing: 26, 24, 22 and, 20. 'What is next? Can you figure it out?' Nora rapidly answers '23'. Karin then asks, 'How did you think'. Nora explains her way through the sequence – 'it is going down …' – and then states that it should be 18. Karin praises her again and asks how much less it becomes at each step. Karin sums up that Nora now knows what a pattern of numbers is. Karin then asks: 'Do you know what the equals sign is?' Nora shakes her head. Karin opposes: 'Yes, I think you know!' Karin continues to explain.

Meanwhile, Nora loses attention and starts to play with the pencil that had been put aside. Karin calmly takes Nora's attention back to their joint focus and puts the pencil away; she also tells Nora that this is to help her, since the pencil is disturbing her. Karin reminds Nora what they have talked about and concludes that the test will now begin. Karin praises Nora at the beginning of the test for having it in focus: 'Really good, you have already written your name'.

Nora is eager to read the tasks herself, first silently and then aloud: 'I will read it like a book [reads the tasks aloud]'. Nora is mostly engaged and looks at the paper; she sometimes sits for several minutes at a time and looks at the tasks, like she is thinking about them. When Nora finishes a task, Karin directs Nora's attention towards the next task. She also checks whether Nora feels ready and is following. Karin touches Nora with her hand when Nora fades in energy, slumps in her seat or stops working. Karin asks Nora throughout the test if she needs anything explained to her. In the middle of the test, Karin decides that a break is needed. Nora gets to stretch out and take deep breaths. Karin puts Nora's focus on how the air feels and they stretch their arms and legs. They also talk about the lunch and the scent from the kitchen.

On one occasion Karin stops and says: 'Before you continue, I want to explain one thing – that is what area is. It is how much of the surface something takes up. This is area [points to the desk]. Do you understand?' Nora answers, 'Yes'. Karin also explains how Nora is supposed to respond to the task at hand: 'You are to put a cross besides the statement that you think is correct'. Nora reads the task and Karin praises her: 'You read very well'. When reading the sentence, Nora stops at the word 'area'. The actual word area seems hard to pronounce and Nora does not recognise it, even though they have just talked about it. They laugh together and Karin says that this was what she just explained.

Several times throughout the test Karin gives back the answer Nora has made and checks whether she is satisfied. Such feedback includes sentences like: 'What do you think … ?", 'So then you think that …', 'What do you think about … ?' or 'Do I understand you correctly … ?' Karin also monitors Nora's perceived level of difficulty – 'Is this complicated?' – and her perceived focus or energy: 'Are you up to it? Otherwise we can take a break and do it later'. She also compensates if Nora fades in energy or motivation: 'I can write, since you are tired'. This is done completely without blame and Karin is very clear that it is to help and unload. Karin also puts a hand on Nora's shoulder to help her keep going. Karin's praise of Nora is continuous, specific, encouraging and positive: 'You can do it', 'Well done', 'You know it!' As they move towards the end of the test, she tells

Nora how much she has already done and how much is still to go: 'Only one task to go. Now you have done the national test in mathematics!'

Narrative 2: Karin's reflections on the video

Karin talks while looking at the video and comments on what happens. She starts by commenting on the warm welcome that she gives the girl, saying 'that girl needs a lot of love'. She also comments on how this occasion is different from her ordinary work in the classroom: 'We sat for almost an hour. She has never done that before' and 'She is not used to listen for this long'. 'Now she looks like any other schoolgirl'. She follows her attempts to push Nora forward and, on several occasions, identifies that Nora actually says no, but Karin keep her going and Nora then looks relieved and committed to their joint task to work through the test: 'It is like I say, well then we will do this . . . and then the girl is with me again and looks happy'.

Karin talks about and recognises that Nora gets tired after a while and sometimes gets tense or stops: 'She cannot concentrate and is tired. She does not want to do more of the test'. Karin also talks about this when saying: 'She cannot concentrate and is tired, Nora does not want to do more of the test but I keep on'. Karin also comments on the mathematical knowledge, working memory and Nora's lack of confidence in mathematics: 'She is supposed to do a pattern, but do not know how and gets tense. She starts to bite her lips. Generalisation is hard for her. She just did the same kind of task and directly after, it is gone from the working memory'.

Karin finds it hard to give Nora positive feedback without revealing anything about the test: 'It is hard to give praise but without giving things away. If it had been an ordinary maths class, she would have been given more feedback. Now she knows that she will not be given that'. To sum up, Karin says that 'Nora is calm and she wants to take the test. Part of my work to make this happen is to build a good relation to the teacher. This is remarkable work she is doing, and she cooperates all the time. It was important that it was only the two of us and I could encourage her'.

Narrative 3: Nora's reflections on the video

While Nora did not remember much from the test, she said: 'The tests are important since you need to know them as an adult'. About the test-taking itself, Nora said: 'I usually do not work when I am in the classroom when everybody is there. So, I usually get to work with Karin'. When Nora looked at the video of the test-taking, she focused mostly on how she and Karin made things. In an attentive way, she talked about the physical things actually took place: 'Look, she is putting the pencil back' or 'Why I did you zoom in here?' I then answered that 'I tried to record what you wrote, but that was not so easy'. Nora then giggled and said: 'Yes, nothing can be seen! Four plus 10 equals three plus one … Seven plus three – that is 10!' Seeing those numbers made her remember and pay attention to the test itself: 'I worked with, what is it called … like a thin book. There you are supposed to divide, to use plus and minus and so on'. Nora sums up by stating that she thinks that the test is similar to an ordinary session with Karin. She could not say whether she thought the test was hard, but she did feel it was boring and she was not nervous.

Levels of participation

The participation that takes place and examples on different levels of participation are described below. At the level of Belonging, Nora is included already as she is allowed to take the test. Access is a level that emerges throughout the other levels and is therefore not reported on individually. Co-action with peers is something that Nora is excluded from physically; in one way, this arrangement makes it possible for her to participate in asynchronous co-action. It was not possible to identify the highest level of participation, autonomy, although this does not mean that it did not occur. Such a participation involves a sense of existential belonging and participation as a highly personal and experience that could not be recorded during the test with this method. Nora that was not present in this data.

Acceptance

Participation as acceptance is displayed when Nora follows the rules and routines of test-taking. In order to be able to follow rules and routines, she must be aware of them and must also be able to do some self-monitoring; this is closely connected to adaptations since Karin has to remind Nora and keep track of the situation and Nora's current state regarding what she remembers or how tired or restless she is. Nora cannot remember everything that was said, but is highly cooperative and listens to Karin. This level of participation emanates from mutual attention on the mathematics tasks and also that the teacher monitors Nora's needs and functions constantly. Helping Nora to accept taking the test is closely connected to her need for adaption and reconciliation. Part of the adaptation is also to push Nora and show trust in her managing, when she herself does not. Karin signals that the mathematics is actually Nora's space and that she should manoeuvre the numbers.

Commitment

The commitment level of participation is shown, for example, when Nora takes on the test with interest and focus and makes her best effort. According to Karin, this opportunity to commit also requires that the class teacher be committed to building good relations with the special education teacher and vice versa. There are also moments of friction and resistance when Nora does not wish to continue. The participation then drops down to the basic level of access. At the same time, Nora does not access the mathematics or the test.

One moment that might include all of the levels is when Nora is given a harder task in the number line. At this moment, it becomes obvious that the mathematical content and the higher levels of participation pre-suppose each other and require communication and adaptation in order to be realised. Nora opposes (belonging is put at risk), but Karin provides support by guiding her and compensating her working memory (giving access and supports co-action), diminishing the tension and resistance (making it possible to accept and commit). This gives Nora access and provides another way to access the task through reading aloud. To sum up, Nora is given access to the mathematics test and content through the explanation of language and symbols, help with writing, concentration, focusing on the right place in the test, taking away distractions, being calmed or encouraged, helped to monitor the test occasion and the answers and to self-correct.

Fabrications of the student in aspects of participation

The level of participation signals how the student can be fabricated. This was something that I added to the model. Merely identifying participation was not sufficient for understanding how this can affect students, both in the lived situation and on a systematic discursive level (see also Langer-Osuna and Esmonde 2017). A student who is constantly participating at the access level, but never beyond, is at the same time fabricated as a student who is at risk of not having access, while a student that struggles to even participate on the level of belonging is fabricated as an outsider. Both of these fabrications exclude the possibility to be fabricated as co-actors. An example of this is when the teacher states that Nora 'looks like any schoolgirl'. Although Karin means that Nora seems to be at ease and can access her thinking and concentration, she also limits Nora to being someone that is not as or one of the 'normal' schoolgirls. This is related to the dilemmas of diversity discussed by Norwich (2014), namely that the student's participation stands in contrast to the protection of the student. Moreover, the participation in the test-taking emerges in the middle of discourses on difference as enabling versus stigmatising.

An example on the access level of participation is the challenge that presented itself as Nora was about to handle the number line. Nora then received support to obtain this access and moved beyond that struggle. This was interpreted as Nora and the teacher fabricating her as someone who belonged, had access, was part of – and even could enjoy – which is included in the levels of participation labelled acceptance or even existential belonging. I conclude from this that the movement between participation levels can be promoted when relationships of power and the positioning of students' knowledge is recognised (see Langer-Osuna and Esmonde 2017).

Conclusions and implications

The boundaries between the three basic aspects of participation and the three advanced ones becomes blurred in the test situation. Communication and the relationship between Karin and Nora seem to be very important for reaching higher levels of participation. The response given to different adaptions, choices of adaptions and reactions to the test is a kind of communication. Karin constantly evaluates Nora's participation as an important part of decision-making. She chiefly responds to signs of lacking commitment or access to mathematical content in her choice of ongoing support. This indicates a fluency of movement between aspects of participation and also fabrications following from that. Processes of supporting access and supporting commitment occur simultaneously and presuppose each other.

The same action or statement could have been categorised in several of the participation levels. In order to know which level of participation is engaged, it would have been necessary to ask Nora in real time how she felt or what she thought, which is not possible in a test situation. Still, using this model to reflect might raise issues regarding if and how commitment or acceptance is made possible for a student. In other words, it seems possible to challenge the 'games of truth' (Ball 2018, 83) in the assessment situation, which might create room for other kinds of positioning than the students as 'subjects of value' (Ball 2018, 80).

Boud and Soler (2016) emphasised 'assessment as a way to focus learning'. I take this a step further and stress that assessment is *a moment* of learning, of what knowledge counts and of becoming a learner in mathematics. In relation to this, I claim that access to success and access to success are interrelated, meaning success stems from access and vice versa. This is a highly complex process and the two pairs predetermine each other. What success and access means goes far beyond the individual's success in obtaining high scores or accessing content in the assessment context. Participation works as representations of power relations and epistemology inherited in sociocultural and political systems. In order to support sustainable assessment for every student, levels of participation need to be taken into account in the researching, planning, execution and evaluation of assessment.

Acknowledgments

This article could not have been produced without the participation of students and teachers. Special thanks is directed to the individuals behind the narratives of Nora and Karin, who allowed the author into a highly sensitive moment of assessment and thereafter talked about their experiences, feelings and opinions about it. Also, I wish to thank reviewers and colleagues who have read the text during the process and given much appreciated and important input.

Disclosure statement

No potential conflict of interest was reported by the author.

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