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Navigating the contradiction between attainment grouping and inclusion in mathematics: the role of teacher identity

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This paper focuses on teaching mathematics in attainment groups as a means of fostering “equal opportunities for learning” (Norwegian: tilpasset opplæring, TPO) and thus meeting the Norwegian education system’s historical aim of inclusive teaching. I report on interviews and classroom observations of one teacher working in a school which has introduced attainment grouping, focusing on how she explains her practice in the context of TPO. Applying Gee’s (2014) theory of language in use and situated meaning, I focus on her enactment of practice in relation to teacher identity and the notion of big D Discourse. The analysis highlights the contradiction between the practice of attainment grouping and the policy of TPO and its implications for the role of teacher identity.

Keywords: Attainment grouping, inclusion, big d discourse, teacher identity, issues.

Introduction

The Norwegian school system has deep roots in inclusive mainstream schooling where teaching is mainly organized in whole class mixed groups. Indeed, the Education Act § 8-2 (Opplæringslova) states that “students shall not *normally* be organised according to level of ability, gender or ethnic affiliation” (my emphasis) (Opplæringslova, 1998). In addition, the national curriculum emphasises the pedagogic principle of “equal opportunities for learning” (*tilpasset opplæring* in Norwegian, or TPO) which emphasizes that education should develop each student’s full potential; it is the teacher’s responsibility to facilitate this. Despite this background, some schools have introduced attainment grouping as a means of organizing TPO, particularly in mathematics. This appears contradictory in the context of an inclusive approach to mathematics teaching and based on what we already know from research on attainment grouping. Drawing on observation and interview data, this paper explores how one teacher navigates this situation in both her teaching and her account of attainment grouping as a means of organizing for TPO. It argues that exploring teacher identity is crucial if we are to understand her stance.

Background literature

There is little research in Norway on the impact of teaching mathematics in attainment groups, particularly on classroom level practices. However, international research reports on differences in teaching practices between groups: teaching in lower attainment groups tends to be more traditional and is dominated by teacher-led teaching and the use of restricted and repetitive tasks. Teachers’ questions are often closed with little opening for critical reflections on mathematical thinking (Kaur & Ghani, 2011). High attainment groups on the other hand are often characterized by more reform-oriented teaching, emphasizing critical thinking and deep learning through problem solving and open-ended tasks. However, work can also be fast-paced, emphasising fluency in procedural algorithms (Beswick, 2017; Francis et al., 2019; Solomon, 2007). Research also suggests that teaching in mixed groups may be less restricted and more investigative: teaching in mixed groups tends to be more

differentiated, while attainment grouping treats students as a homogenous group on the same level (Francome & Hewitt, 2020; Taylor et al., 2017). Attainment grouping may therefore lead to a more restricted access to mathematics in terms of both pedagogy and content, leading to student labelling and a fixed ability view of both low and high attainers (Francis et al., 2017; Taylor et al., 2017). Teachers' perceptions of students are important. Beswick (2017) asked teachers to describe "poor" and "rich" students, finding that poor students were described as lacking proficiency, understanding and ability to explain mathematics. "Rich" students were described as being proficient in describing skills and knowledge. On this basis the "poor" students were offered restricted tasks and "good" students more open-ended tasks (Beswick, 2017). Similarly, Mazenod et al. (2019) found that teachers of lower attainers took a nurturing approach, believing that students should not be over-challenged; this led to an "over supportive" pedagogy which limited development.

As noted above, the literature indicates that attainment grouping leads to limited access to mathematics and differences in teaching approach which suggest that the practice of attainment grouping is not consistent with the view of inclusive mathematics teaching encapsulated in the Norwegian emphasis on inclusion through TPO. This tension is observed by education researchers in Norway, but the increasing practice of attainment grouping is largely unquestioned, driven as it is by pressure from international tests which show Norway underperforming in comparison to other countries (OECD, 2016) and arguments that grouping benefits higher attainers (National Centre for Science Education, 2015). Hence, to explore how teachers meet TPO policy in the context of attainment grouping, this paper addresses the Research Question: *How do teachers navigate the relationship between TPO and attainment grouping?*

Theoretical framework: "big D Discourse"

In this paper I draw on Gee's (2014) theory of language in use and situated meaning to enable a focus on teachers' enactment of their classroom practice within the context of policy requirements and school organisation. Gee's theory emphasizes the role of "big D" Discourses which are distinct from "small d" discourse and its focus on language. "Big D" Discourse captures actions as well as words, and in this sense, it also captures identity performance, which involves

ways of enacting socially situated identities and associated practices in society through language and ways of acting, interacting, valuing, knowing, believing and using things, tools and technologies at appropriate times and places. (Gee, 2014, p. 127)

Enacting and being recognized in a Discourse requires more than language. When people are engaged in Discourse, they use language to engage in a practice to do things, but also to *be* things as they take on socially situated identities. Gee emphasizes that saying-doing-being gains its meaning from the practice it is a part of and enacts (Gee, 2014, p. 11). He foregrounds identity, arguing that saying things "never goes without also doing things and being things" (Gee, 2014, p. 3), and thus concerns recognition as a certain kind of person engaged in a certain kind of practice. To "pull off" a Discourse therefore requires the individual to both "talk the talk" and "walk the walk" (Gee, 2014, p. 24).

Gee also draws on the idea of figured worlds (Holland et al., 1998) to understand how situated meanings are constructed:

Figured worlds is a theory, story, model or image of a simplified world that captures what is taken to be typical or normal about people, practices, things or interactions. (Gee, 2014, p. 226)

A figured world is thus a local simplification which mediates between local social interactions and Discourses, enabling enactment of a Discourse. This simplification aspect of figured worlds means that they often relate to particular values about how things are, or should be. The concepts of big D Discourse and figured worlds provide not only a theoretical perspective on the nature of situated meanings, but also a method of inquiry as outlined below.

Methodology

The work presented here is part of a larger study focusing on attainment grouping in mathematics teaching and TPO, involving four 9th grade mathematics teachers in one lower secondary school (Berg School) in Norway. Berg School had organized mathematics teaching so that the four 9th grade class groups were taught for two of their three weekly lessons according to attainment level, and in their remaining lesson as a whole class mixed group. Each of the four teachers were responsible for one attainment group and one whole class mixed group. This paper focuses on a case study of Lena, who teaches group 4, the highest of the attainment groups. The data includes two semi-structured interviews and classroom observations of three of Lena's lessons (one week of teaching). The first interview took place before observation and focused on her view of teaching in attainment grouping and TPO; the second interview took place after the classroom observations and included reflections on the lessons observed. All names of people and places are pseudonyms.

Interviews were transcribed in full and analysed by searching for references to "big D Discourse" (what kind of teacher Lena described herself as or how she wanted to be) and "figured worlds" (Lena's theories of teaching and learning, in particular her references to values about how mathematics teaching is or should be). The observation episodes were also transcribed and annotated to record Lena's and students' movement about the classroom, student hands up and so on. My analysis focused on Lena's use of questions and discussion, wait time, her use of tasks, and her use of explanations. I was interested in her choice of whole class teaching or individual work for particular activities. I also noticed how she distributed time among students and her use of positioning. Seeing big D Discourse as enactment of identity and associated practices, these references enabled an analysis of Lena's teaching practice as socially situated identity performance – that is, as performed within the context of TPO and the school's emphasis on attainment grouping.

Analysis

In this section, I draw on both the interview and observation data to analyse Lena's enactment of teaching in attainment groups and TPO, bearing in mind the big D Discourse emphasis on "saying, doing and being". Hence the interview and observation data are presented together in the analysis, since they mutually support each other in the application of big D Discourse.

A figured world of fixed ability

In the interview, Lena is clear that she sees attainment grouping as the best way for organising mathematics teaching for TPO. Her arguments suggest that she draws on a figured world in which mathematical ability is fixed. This becomes evident in her descriptions of teaching in different

attainment groups and students learning according to different levels: “everyone gets something on their own level (...) and everyone is about the same level then (...) it will not be too easy or too difficult. That it is right where someone is”. Lena talks about the students as “different kinds of students” and describes them in the context of homogeneous groups based on different levels, where the students in one group are alike and have the same ability, both in terms of understanding mathematics as well as in their way of thinking: “...the others [in the group] have the same opinion, ... and everyone really thinks the same way”.

This view of students being alike can also be seen in how she describes what characterizes the mathematics and teaching approaches in the different groups. Referring to teaching for the low attainers she talks about “the “didactics” of the weak”, in which teaching is “a bit easier and a bit more practical”. In contrast she describes high attainers as taking a more formal approach to mathematics. This approach was also evident in the observation data, where her group 4 teaching valued a procedural approach to practicing Pythagoras’ theorem and how to write it down correctly:

Lena: And then when we write down and solve those tasks, what do we always start with then? ...

Kari: Writes that formula.

Lena: Writes that formula $k^2 + k^2 = h^2$ (Lena writes the formula on the board)

She also contrasts the low and high attainers in terms of what she sees as the usefulness of drawings for the low attainers, while the high attainers are not in need of images and examples to the same extent as the low attainers “...because that’s the way their brains are made”.

Lena’s figured world of fixed ability is also apparent when she refers to how she limits the content of talk in mixed whole class discussions because of all the different levels represented in the class.

When I have a whole [mixed] class, I often set the level on use of concepts and... like I do not go into depth in the class talks.... Have them explain to me what they think... Instead of (...) problem solving tasks where there is a little ... high level then.

This assumption of a figured world in which there is an average level of whole class mixed group was also evident in her teaching in this group. Lena started the lesson by giving a short repetition of how to make diagrams in Excel before the students were asked to try this out as a repetition activity.

Being a caring teacher

Lena is concerned about having a good relationship to the students and she refers to this as “most of her job”, assuming a figured world in which good relations between teacher and students is an important basis for learning. This perspective indicates a Discourse of being a kind teacher who cares about the students. This is also evident in how she justifies parts of her teaching based on what the students “like to do” and what they think is “fun”: “...they like to do tasks. (...) at least in the high group, they learn a lot from working for themselves. (...) And at the same time, it is the task that they want for themselves”

The Discourse of a caring teacher is also visible in her theory of the importance of providing a comfortable learning environment for all the students in an attainment group. Comparing teaching in group 4 with teaching in whole class mixed groups, she says that it is “better” with group 4, because:

“... the students may feel a bit more comfortable, that it’s kind of okay to be quite good. Because here all are good”.

This caring aspect is also evident in her teaching. Often, Lena’s discussion with the students does not focus on mathematics but is more about everyday life. Her language can be characterized as youthful and friendly in tone, almost like chatting. For example, Lena joins in when some of the girls start to talk about the price of the food in the school canteen, and when other students talk about the next tests and assignments in other subjects that week. Lena also enacts the caring teacher when the students work individually on tasks. As she circulates around the classroom, her comments are mainly “how is it going” rather than on the mathematics in the tasks – she does not probe what lies behind the students’ frequent answers of “fine”. There is thus a lot of social work going on in the lesson. Lena’s position in the classroom in this part of the lesson is more as a “mate” to the students than as the teacher in a position of authority.

Lena’s argument for teaching in the different attainment groups also draws on a theory of the need to take a nurturing approach to teaching. She is concerned that the mathematics teaching and content should be manageable for the students, and especially the low attainers, and that teaching should not expose the students to “too much or too difficult” stuff. As a caring teacher, Lena argues that they should be exposed to a limited mathematics content, just enough to get by: “...they should at least be able to ..., enough to do well enough on the exam anyway”.

This theory of teaching is also evident in a group 4 lesson where one of the students, Tom, stops Lena in her teaching of the procedural solution of Pythagoras’ theorem. Although this is the higher attainment group, Tom is unhappy with the pace, and asks (implicitly) for things to slow down. Lena’s immediate response and her subsequent action suggests that she positions him as weak in the group and in need of individual attention:

Tom: It's going too fast

Lena: Am I going too fast? ... We'll look at that a bit afterwards.

Tom: Yes

Lena does not treat Tom’s interruption as a request for the whole group to engage in further explanation of the mathematics. Instead, she finishes her teaching with the whole group, then comes back to talk to Tom individually. She repeats the procedure for him, going through it step by step, but now at a slower pace. Importantly, she limits her explanation to how to write the solution down, telling him to use the example as a model for the next questions. It seems as though she tries to reduce the demands on Tom, making the question merely manageable for him.

“I need control in teaching”

Lena is also a teacher who needs to be in control in her teaching. She explains that she chooses teaching approaches which are comfortable for her. One of these is talking to the students individually instead of in whole class discussion, so that she can maintain control, as in the example with Tom above. She also explains that she prefers to teach the high attainers in group 4, and that she is not comfortable with teaching the low attainers: “And, you maybe need to go down to the practical level, which I am not fond of. And then I get uncomfortable too, it just gets messy all together”.

For Lena, attainment grouping makes it possible to avoid “uncomfortable” teaching where she is not in control. She argues that Jon, one of the other teachers, is the best person to teach the low attainers, simultaneously ensuring that she should not have to teach this group.

... the one who has group 1, he has actually always had group 1, is very good at the [pedagogy]/didactics of the weak. (...) and is very good with that kind of student ... So, he wanted to have that group.

Although Lena argues for attainment grouping as the best way to teach TPO she also argues for it as better for teachers, because they are more in control: “And then we wanted to try it out to make it a little better for us teachers, to have a little more, control of the lesson then”. This emphasis on control is enacted in her practice in her emphasis on ensuring that the students write solutions in “the right way”. For example, she tells the students to start each new question by writing up Pythagoras’ formula:

And what is it that is important to watch out for when we are going to WRITE pieces like this? (...) The equal symbol below each other (Lena points to her correct notation on the board) ... because then it looks much tidier.

Identifying with the high attainers

Lena’s wish to teach in group 4 is not just related to her need for control in teaching. When she describes her own mathematical thinking, she identifies herself with the group 4 students:

I like, I like it best in group 4. Because they, eh, I'm a bit bound by rules myself. Because I'm kind of the same type. (...) Eh, so that's a bit like that, there I can see how it, why they think what they do too. Because that's also the direction I'm going.

She describes herself as the same kind of mathematics person as the students, as a mathematically strong teacher. In her teaching, this view appears in how she explains the mathematics to the students, positioning herself as the authority in the classroom. She appears to emphasize the mathematics in group 4 as the most valued, enacting the Discourse of a mathematically strong teacher which assumes a figured world of fixed ability both about the students and herself as the teacher. She appears to see herself as ideally suited to teaching the high attainers.

Discussion

In this paper I have addressed the research question, “how do teachers navigate the relationship between TPO and attainment grouping?” I have focused on the story of one teacher, Lena, and her enactment of teaching in attainment groups. The analysis reveals that Lena brings TPO and the way her school organises mathematics teaching together by identifying as a caring teacher, and by drawing on a figured world of fixed ability which enables her to enact the big D Discourse of the mathematically able teacher meeting the needs of mathematically able students.

Inclusive mathematics teaching means that all students are included regardless of assumptions we might make about their potential for learning. Lena argues for attainment grouping as the best way to address TPO and inclusive teaching, but her enactment of teaching does not necessarily lead to an inclusive mathematics teaching for all students. In her fast-paced work on applying the Pythagorean

algorithm she excludes Tom from taking part in the teaching with the rest of the class. Rather than opening up a whole class discussion, Lena isolates Tom and enacts the approach of the caring teacher, giving him a barely modified instruction that repeats her original teaching more slowly, with an explicit instruction that he should just follow the procedure with other questions. Lena's teaching can also be seen as non-inclusive in that she sees procedural knowledge as valuable for the high attainers, compared to limited content and restricted tasks for low attainers. It appears that her view of TPO and inclusive mathematics teaching concerns adapting teaching approaches and mathematical content in accordance with a figured world in which ability is fixed. Furthermore, her procedural approach excludes group 4 students from an explorative approach to mathematics and discussion for deep learning. This too is closely connected to a figured world in which ability is fixed. Coincidentally, this appears to serve a need for control, which may itself be an element of the same figured world in which teachers are authority figures.

Lena's enactment of teaching in attainment groups and her figured world of fixed ability is also related to the Discourse of being a caring teacher, in line with the nurturing approach to low attainers identified by Mazenod et al. (2019). Lena justifies limiting content for the low attainers on the grounds that they need only to pass the exams, and for her, seemingly as a good way of organising for TPO and inclusion. Although the Discourse of being a caring, nurturing teacher may be a way of enacting inclusion, Lena appears to prioritise good relationships and care for her students as a basis for their learning, but the result is their exclusion from engagement with mathematics learning.

This big D Discourse analysis of Lena's identity as a mathematics teacher brings together observation of her enactment of teaching in attainment groups and her account of her practice within TPO. It reveals complexity and tensions in her practice, values and enactment which make sense when we take the context she operates in into account. As noted above, in Norway the move to attainment grouping is not contested despite research evidence that it is not beneficial. Locally, Berg School has compounded this situation by deciding that TPO in mathematics teaching will be addressed through attainment grouping. Although Lena has been party to this decision, it is not hers alone; additionally, there are pressures outside of the school which prioritise examination performance. In this general context, Lena's socially situated identity as a mathematics teacher draws on particular figured worlds in which doing mathematics is seen as procedural and fixed in order to support her enactment of the mathematically able and competent teacher who supports all her students.

Lena seems unaware that her approach to teaching in attainment groups can lead to exclusion from mathematics. She seems also unaware about the tension between her figured world of fixed ability and the idea of inclusive teaching, and the potential impact of a nurturing approach on inclusion. An implication of this study is that it is important for teacher educators to work with teachers to explore teacher identity and their "big D Discourse" in order to support a more reflective enactment of their teaching practise for TPO and inclusion.

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