



HAL
open science

Beyond the immediate – illuminating the complexity of planning in mathematics teaching

Helena Grundén

► **To cite this version:**

Helena Grundén. Beyond the immediate – illuminating the complexity of planning in mathematics teaching. Eleventh Congress of the European Society for Research in Mathematics Education, Utrecht University, Feb 2019, Utrecht, Netherlands. hal-02430064

HAL Id: hal-02430064

<https://hal.science/hal-02430064>

Submitted on 7 Jan 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Beyond the immediate – illuminating the complexity of planning in mathematics teaching

Helena Grundén

Linnaeus University, Sweden; annahelena.grunden@lnu.se

In mathematics education, there is a growing interest in research on social aspects such as how mathematics teaching in classrooms is informed by society. Consequently, new sets of theoretical frameworks and methods have to be taken into account. In a focus group study, Critical Discourse Analysis (CDA) was used as a theoretical framework, which enabled the researcher to see how mathematics teachers resist and construct a discourse of mathematics teaching apart from the official discourse. Also shown in the study is that power relations are circulating and thereby influencing teachers in the process of planning in mathematics. In this paper, results from the study are used to emphasize CDA as useful for mathematics education researchers seeking to grasp the complex, dynamic, and emerging nature of mathematics teaching.

Keywords: Critical Discourse Analysis, mathematics teaching, power.

Introduction

Prior studies within the TWG19 have in different ways underlined “the dynamics of the research activity aiming at ‘unpacking’ teaching practice”, mainly by focusing “the micro-level of classroom practice, on the resources teachers draw on as they engage in it, and their (intentional or unintentional) professional activity” (Sakonidis, Drageset, Mosvold, Skott, & Taylan, 2017, p. 3039). However, mathematics teaching is framed by “contextual, epistemological, and social issues” (Potari, Figueiras, Mosvold, Sakonidis, & Skott, 2015, p. 2972), which means that ‘unpacking’ teaching practice and exploring the complexity of mathematics teaching requires research moving beyond immediate classroom situations.

Teachers’ planning is one aspect of mathematics teaching practice(s) that often is done outside classrooms. One aspect of understanding development of this specific part of teaching practice(s) is to explore influence of various factors such as “how micro-level interactions (classroom and school) are informed by macro-level structures (society, culture and the politics)” (Sakonidis et al., 2017, p. 3033). Theoretical frameworks and methods traditionally used for classroom studies might not be enough to grasp what Sakonidis et al. (2017) refer to as the macro-level structures, i.e., society, culture, and politics. Hence, a framework acknowledging “the significance of the multiple micro- and macro factors that may influence how learning and lives in classrooms unfold” (Skott, Mosvold, & Sakonidis, 2018, p.171) is needed.

An ongoing focus group study focuses on planning in mathematics teaching. The study aims to explore in what ways power is visible in mathematics teachers’ talk about planning and the research questions guiding the study are: “What practices are visible when teachers talk about planning in mathematics?”, and “In what ways do teachers refer to these practices?”. In this paper, theoretical assumptions underlying the design of the study and preliminary results from the study are presented

through an empirical example, discuss Critical Discourse Analysis (CDA) as an option for studies aiming at going beyond the immediate and observable classroom events.

Theoretical framing

In the following section, CDA and relevant theoretical constructs of practice, power, and discourse are presented in relation to previous mathematics education research. CDA is emphasized as a useful approach when wanting to explore relations between educational practices and social contexts (Mullet, 2018). In CDA the research interest is social practices, which include both communicative interaction (between actors) and the structural conditions framing the communication (Chouliaraki & Fairclough, 1999). Hence, a CDA perspective will embrace both structures and actors acknowledging that discourses shape humans as much as humans shape discourses (Fairclough as cited in Lund & Sundberg, 2004, p. 25). There is a dialectic relation between on the one hand to preserve and reproduce structures, and on the other hand, actors transforming and diversifying discourses (Lund & Sundberg, 2004). Adopting this perspective in relation to planning in mathematics would imply seeing the teacher as an actor within the structure of mathematics, the structure of mathematics education, and the structure of school.

Within CDA there is no disjunction between micro-, macro-, and meso level. Instead of analyzing different levels, different aspects of practice are analyzed through phases of text, discursive practice, and social practice. Texts expressed discursively are produced within a social practice (Chouliaraki & Fairclough, 1999). CDA has been used and discussed in mathematics education, mainly with a focus on texts and linguistics (e.g., Le Roux, 2008; Morgan, 2014). However, staying close to the text is not the only possibility. In CDA, focus on three levels is possible: “the communicative interaction itself; the discursive resources used in the interaction and the orders of discourse from which they are drawn; the social structures and socio-cultural practices within which the interaction is situated” (Chouliaraki & Fairclough, 1999 as cited in Morgan, 2014, p.6). In Le Roux (2008) Fairclough’s three-dimensional model is used “as a framework for studying the relationship between the written text of a mathematics problem, the associated discursive practices (the processes of text production, distribution and consumption of the text) and the wider social practice of which the discursive practices form part” (La Roux, 2008, p. 313). The three-dimensional model can also be used to describe a teacher talking about planning. The teacher produces a text (the talk) within a discursive practice (i.e., the college of mathematics teachers in the school) that is embedded within a social practice.

Practices

Within the CDA perspective, as well as in prior mathematics education research, the term ‘practice’ is common. However, there is not a mutual understanding of the term. In mathematics education research, the term has evolved from a cognitive, individual perspective focusing on actions and behaviors and underlying beliefs, intentions and knowledge, to a sociocultural perspective within which ‘practice’ is a social phenomenon and includes teachers’ and students’ recurrent activities and norms (Skott et al., 2018). The meaning of the term ‘practice’ has in some studies also expanded to include parts of teachers work that happens outside the mathematics classroom (Skott et al., 2018). This latter understanding of the term is in line with meaning of practice in the CDA

perspective where ‘practice’ grasps both individuals’ actions and the more habitual, common ways of acting (Chouliaraki & Fairclough, 1999). Hence, thinking of planning for mathematics teaching as a practice would enable to see teachers’ actions both as individual and shared by other mathematics teachers. It would also enable to get hold of the relationship between abstract structures and peoples acting, or how social structures govern people’s possibilities to act.

In the CDA perspective, using the term practice implies that there are internal power relations and a struggle between different actors. In the practice of planning, there are actors such as colleagues, students, and school leaders who may not share the same ideas about mathematics teaching. These different ideas lead to tensions and influence teachers’ planning (Grundén, 2019), which can be seen as a struggle between actors. This struggle reproduces and transforms structural conditions. However, the internal power relations of a practice are also influenced by its relation to other practices (Lund & Sundberg, 2004). Teachers’ planning in mathematics teaching is thus framed by structural conditions produced in past and present educational systems but is also framed by structural conditions produced by mathematics community, and mathematics education community. Hence, there is an on-going struggle where structural conditions are negotiated.

Power

In mathematics education research, different notions of power are used (Gutiérrez, 2013; Valero, 2008). In this paper, power is used from a CDA perspective, i.e., always present in and between practices, and seen as situated, relational, and in constant transformation. Transformation occurs when people participate and act in the construction of discourses (Valero, 2004). Hence, power in relation to planning for mathematics teaching is in constant circulation and transformation. Power is not seen as only operating from ‘above,’ from for example government and school leaders. On the contrary, all actors within a practice, such as teachers, students, and parents as well as government and school leaders might have power.

Discourse

Another construct important within the CDA perspective is discourse. The term is used in a variety of ways in mathematics education research and the conceptual clarity in many discourse studies is weak. In a literature review on mathematics education, articles were found to focus on three topics: discourse as social interaction; minds, selves, and sense-making; and cultural and social relations (Ryve, 2011). In this paper, the focus is on social structures and meaning is seen as situated and co-constructed which would place the research within the topic area of cultural and social relations. In Ryve’s categorization, this implies an interest in “macro processes of social and institutional actions” (p. 172). Many studies within this topic area draw on work of Foucault, with the consequence that discourses are analyzed as language games maintained by power relations and little agency is ascribed to individuals (Ryve, 2011). This perspective is often criticized since there are few possibilities to transcend the binding discourse order (Lund & Sundberg, 2004).

On the other hand, within the CDA perspective there is a dialectic relationship between humans and discourses (Lund & Sundberg, 2004) and discourse is seen as “use of language seen as a form of social practice, and discourse analysis is analysis of how texts work within sociocultural practice” (Fairclough, 1995, p.7). Within a discursive practice such as a college of mathematics teachers

planning for teaching, texts are produced, distributed, and consumed in specific ways and in line with the social context in which it is embedded. What is analytically interesting is not to “discover” and construct “new” discourses but how the individual teachers through acting represent, produce, and legitimate discourses on specific grounds. Discourses are studied based on their effects on different levels; situational, institutional, and societal (Lund & Sundberg, 2004, p. 26)

Empirical example – Focus group

Results from a previous study (Grundén, 2017) in which teachers were interviewed with a focus on meaning in relation to planning in mathematics show that teachers refer to aspects beyond the immediate planning in their talk, they refer to practices other than the practice of planning in mathematics. In an ongoing study, focus group interviews are used to explore how these practices are visible and how power operates within and between them. The researcher met with six different groups at four different schools. The number of participants in the groups was between 2 and 5. The interviews lasted between 65 and 90 minutes. After an introduction consisting of a presentation, a reminder of informed consent, and a short presentation of the previous study the researcher started the discussion by placing pieces of paper in the middle of the table. On some of the pieces, there were words written; some of them were empty. The words that were written were six common influencing aspects identified in the previous interview study: Students, School management, National tests, Templates/forms, Parents, and Textbook. Participants were asked to look at the words and think about if any of them had any relation to their process of planning in mathematics. The words were seen as stimuli for the discussion. Participants were also told that they could add aspects they thought were missing and remove aspects that they did not think were related to planning. During the discussion, the role of the researcher was to ask follow up questions and challenging questions and to make room for all participants and invite them in the conversation, and through small words and gestures confirm that she was listening.

Since the aim of the study was about the practice of planning rather than individual teachers’ planning the discussions were transcribed without marking different voices. Instead, all statements were seen as examples from the practice of planning in mathematics teaching. For this paper, preliminary results from one of the focus groups are presented. The reason for presenting results from this group was a telling example of when a social practice influenced planning in mathematics teaching. The group consists of four teachers working in school year 1 at the same school, a small school with pre-school class, first class, and second class. The teachers had scheduled time together every week and were used to working together. At the beginning of the discussion, the group wanted to add an aspect, ‘National support for assessment,’ that for them was related to planning. A transcript of the discussion that followed was analyzed as described in the following section.

Acknowledging meaning as situated and power as an issue in social practices (e.g. Valero, 2004) implies that power is present also in the interview situation. In this study, efforts were made to diminish influence of researcher by letting participants choose and talk freely about issues related to planning introduced with no further explanation. However, there is always a possibility that researchers influence arguments in texts produced by participants which have to be taken into considerations when valuing results.

Analysis and results

There is no particular method for analysis in CDA studies. However, there are common features in the analysis made within the perspective where the analysis “oscillates between a focus on structure and a focus on action” (Fairclough, 2001 as cited in Mullet, 2018, p. 118). Mullet (2018) describes a general analytical framework for CDA in which several CDA approaches are condensed into seven stages of analysis. The first three stages are preparatory and include selecting the discourse under investigation, select data sources and prepare them, and examine the background of text and producers of text. The fourth stage when analyzing a text is to identify overarching themes for example by using thematic analysis. (Mullet, 2018). After that analysis of external (stage 5) and internal relations (stage 6) in the text takes place. When analyzing external relations, interdiscursivity, social practices’ influence on arguments in the text as well as the text’s influence on social practices are examined. The analysis of internal relations is focused on “patterns, words, and linguistic devices that represent power relations, social context (e.g., events, actors, or locations), or speakers’ positionalities.” (p. 124). In stage 7 meanings of major themes and internal and external relations identified in stage 4, 5, and 6 are interpreted.

In the following section, results of the external and the internal analysis of the focus group study are presented. The theme of the first example is assessment material on number sense from the National Agency of Education that is mandatory to conduct with all year 1 students. One of the groups wanted to add ‘National assessment support’ to the words in the middle of the table. The following discussion took place¹:

- 1 Teacher: It is extremely time-consuming. It takes too much time from teaching
- 2 Teacher: ...teaching has to come first, before Skolverket’s [National Agency of Education] assessment support ...
- 3 Teacher: We have also said that the assessment support and national tests have never shown us something we didn’t already know.
- 4 Teacher: And the municipality requires documentation from us, and they have chosen another type of documentation than Skolverket wants, which leads to additional workload”.

In this section, we can see that there are social practices influencing arguments in the text (stage 5). Teachers talk about Skolverket [National Agency for Education] (line 2 and 4) and municipality (line 4) which both can be seen as actors within an official practice. Other elements of the official practice are visible when teachers talk about the assessment support (line 1, 2, and 3) and national tests (line 3).

By focusing on patterns, words, and linguistic devices, i.e., the internal relations (step 6) in the text we can see how teachers have to relate to the assessment support when planning. In the first utterance, a teacher implicitly expresses that they have less time for ‘teaching,’ thereby also implicitly saying that doing the assessment tasks with students is not part of ‘teaching.’ By the

¹ My translation from Swedish

choices of words ‘extremely’ and ‘too’ the teacher reinforces the impression that the assessment support is something that is not considered valuable. This view is also visible in the second utterance, where the teacher emphasizes that teaching is something else, more valuable than the assessment support. By seeing Skolverket as the owner of the material, the teacher distances herself and gives the impression that the assessment support intrudes teaching.

In the third statement, the participant sees herself as part of a practice by referring to ‘we.’ Within the practice, information obtained by assessment support and national tests is unnecessary because it already has emerged through teaching. In the last statement “the municipality requires” another type of documentation than “Skolverket wants” indicates that the documentation for Skolverket seems more reasonable than the documentation for the municipality. This is strengthened by the claim that the requirements from the municipality lead to “additional workload.”

The counterpart in the above example is Skolverket, which on their webpage describes the assessment support as follows:

In the subject of mathematics there is a national assessment support in number sense for school year 1–3. It is mandatory for head of school² to use assessment support in school year 1. It is Skolverket’s assessment support in number sense, published in 2018, that should be used [...]. The assessment support aims to make it easier for you as a teacher to follow up on students’ knowledge in school year 1–3. With help from assessment support students that already have, or are in the risk of having, difficulties in number sense in mathematics can be early identified. You can also see when a student has come further in her knowledge development and need further stimulation (Skolverket, 2018³).

Here, the words ‘support’ and ‘mandatory’ are of interest. Making support mandatory assumes that users, in this case, the teachers, are in need of support and that they do not seek the support they need. Since the assessment support is “mandatory for the head of school” an alternative interpretation could be that Skolverket by saying that it is mandatory wants to clarify that the head of school has to create conditions for teachers to make the assessments. However, there are wordings such as ‘for you as a teacher’ indicating that teachers are the actual receivers, and teachers are also the ones who conduct the assessments in the material.

Through the analysis of the four utterances and the quotation from Skolverket, it is possible to see that power is circulating around and within the practice of planning. Through the way the teachers speak, it becomes clear that the assessment material is seen as worthless and something that stands in the way for teaching. On the contrary, Skolverket emphasizes the assessment support as helpful in teachers’ possibilities to individualize teaching. The teachers can either choose to resist given instructions and not let their students do the assessments or choose to follow them and thereby renounce what they count as teaching. In this case, the teachers choose to conduct the assessments, which in line with the analysis have the consequence that students have less mathematics teaching.

² In Sweden, ‘head of school’ means the authority responsible for a school or several schools. It can be a municipality, the state, or a private actor.

³ My translation from Swedish

Discussion and conclusion

By analyzing what the teachers said with regard to external relations (Mullet, 2018) Skolverket's influence on arguments in the text was made visible. It was also visible how decisions made by Skolverket influenced decisions that the teachers made regarding their teaching. By focusing on internal relations (Mullet, 2018), the resistance of the teachers was apparent. In their meta-reflection on planning the teachers emphasize explicit power relations and perceive Skolverket and the municipality as disturbing power factors. When expressing dissatisfaction, they resist the official practice and make room for an alternative discourse of mathematics teaching where the actors of the official discourse are not invited. Hence, teachers enter as actors in a discursive struggle for power where they, on the one hand, perceive instructions and requirements from Skolverket and the municipality as "something else" than their own pedagogical discourse and on the other hand realize that they have to follow instructions and requirements given by them.

Relating the power relations and the struggle between actors visible in the above examples to what is happening in the mathematics classroom is two-folded. On the one hand, it contributes to explanations of what is happening in the teaching situation when the students do the assessment tasks, but also bring clarity to aspects of teaching that never are visible in classrooms. Teachers in the example abandon what they consider to be teaching to comply with the directives of Skolverket. Insights like this might be important for example in discussions about implementing research results. Often it seems to be assumed that teachers do not teach desirable ways because they do not know how to do. Consequently, implementing research seems to be about telling teachers how to do. Findings indicate that an awareness that teachers make decisions in a practice influenced by others and sometimes not teach the way they want is crucial in implementation work.

So, is CDA useful in mathematics education research? Results presented above indicate that theoretical constructs from CDA such as practice (e.g., Chouliaraki & Fairclough, 1999) and power (e.g., Valero, 2004) help to make visible what Sakonidis et al. (2017) describe as how classroom and schools are informed by society, culture and politics. Hence, CDA might be a possible answer to the call for a framework that acknowledges "the significance of the multiple micro- and macro factors that may influence how learning and lives in classrooms unfold" (Skott et al., 2018, p.171), and studies using CDA might contribute to research in mathematics teaching with insights beyond the immediate.

References

- Chouliaraki, L. & Fairclough, N. (1999). *Discourse in late modernity: rethinking critical discourse analysis*. Edinburgh, Scotland: Edinburgh Univ. Press.
- Fairclough, N. (1995). *Critical Discourse Analysis*. London, UK: Longman.
- Grundén, H. (2017). Practice of planning in mathematics teaching – meaning and relations. In T. Dooley & G. Gueudet (Eds.), *Proceedings of the Tenth Congress of the European Society for Research in Mathematics Education* (pp. 3065–3072). Dublin, Ireland: DCU Institute of Education & ERME.

- Grundén, H. (2019). Tensions between representations and assumptions in mathematics teaching. In J. Subramanian (Ed.), *Proceedings of the Tenth International Education and Society Conference*. Hyderabad, India: MES10
- Gutiérrez, R. (2013). The socio-political turn in mathematics education. *Journal for Research in Mathematics Education*, 44(1), 37–68.
- Le Roux, K. (2008). A critical discourse analysis of a real-world problem in mathematics: Looking for signs of change. *Language and Education*, 22(5), 307–326.
- Lund, S. & Sundberg, D. (2004). *Pedagogik och diskursanalys*. [Pedagogy and discourse analysis]. Växjö, Sweden: Växjö Universitet.
- Morgan, C. (2014). Understanding practices in mathematics education: Structure and text. *Educational Studies in Mathematics*, 87(2), 129–143.
- Mullet, D. R. (2018). A general Critical Discourse Analysis framework for educational research. *Journal of Advanced Academics*, 29(2), 116–142.
- Potari, D., Figueiras, L., Mosvold, R., Sakonidis, C., & Skott, J. (2015). Introduction to the papers of TWG19: Mathematics teacher and classroom practices. In K. Krainer & N. Vondrová (Eds.), *Proceedings of the Ninth Conference of the European Society for Research in Mathematics Education* (pp. 2968–2973). Prague, Czech Republic: Charles University in Prague, Faculty of Education and ERME.
- Ryve, A. (2011). Discourse research in mathematics education: A critical evaluation of 108 journal articles. *Journal for Research in Mathematics Education*, 42(2), 167–199.
- Sakonidis, C., Drageset, O. G., Mosvold, R., Skott, J., & Taylan, R. D. (2017). Introduction to the papers of TWG19: Mathematics teachers and classroom practices. In T. Dooley & G. Gueudet (Eds.) *Proceedings of the Tenth Congress of the European Society for Research in Mathematics Education* (CERME10, February 1–5, 2017) (pp. 3033–3040). Dublin, Ireland: DCU Institute of Education and ERME.
- Skolverket, (2018, November 24). *Matematik*. Retrieved from https://bp.skolverket.se/web/bs_gr_grgrmat01_1-3
- Skott, J., Mosvold, R., & Sakonidis, C. (2018). Classroom practice and teachers' knowledge, beliefs and identity. In T. Dreyfus, M. Artigue, D. Potari, S. Prediger, & K. Ruthven (Eds.), *Developing research in mathematics education. Twenty years of communication, cooperation and collaboration in Europe* (pp. 162–180). Oxon, UK: Routledge.
- Valero, P. (2004). Socio-political perspectives on mathematics education. In P. Valero & R. Zevenbergen (Eds.), *Researching the socio-political dimensions of mathematics education, issues of power in theory and methodology* (pp. 5–24). Boston, MA: Kluwer Academic Publisher.
- Valero, P. (2008). Discourses of power in mathematics education research: Concepts and possibilities for action. *PNA*, 2(2), 43–60.

