Discourse as a Catalyst for Facilitating Practitioner Research[1]

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In this paper, I present the initial plans for a beginning *collaborative research partnership* (Grundy, 1998) involving myself, two graduate students, and nine middle school mathematics teachers who work with students aged ten to 14 This paper provides information about the guiding literature (on discourse, teacher beliefs, and practitioner research) and the project plans I hope to get critical feedback from this international audience of mathematics educators so that I can improve the plan prior to intense data collection during the upcoming academic year

In this paper, I present the guiding literature and initial plans for a beginning collaborative research project The broad goals of the project are to examine: the nature of the discourse in nine middle school mathematics classrooms in the United States (US); the ways in which the participating middle school mathematics teachers' beliefs impact the discourse when working to enact reform-oriented[2] mathematics teaching; and how this information can be used to incorporate practitioner research using concepts and tools of discourse analysis to improve mathematics instruction

Introduction to the Project

The following quote highlights the ways in which two of the three research areas from which this project draws—discourse and teacher beliefs—complement each other:

> The discourse *embeds* fundamental values about knowledge and authority Its nature is reflected in what makes an answer right and what counts as legitimate mathematical activity, argument, and thinking Teachers, through the ways in which they orchestrate discourse, convey messages about whose knowledge and ways of thinking and knowing are valued, who is considered able to contribute, and who has status in the group (NCTM, 1991, p 20, emphasis added)

How we come to use specific discourse patterns (especially in school) and the set of beliefs that we hold are deeply and tacitly *embedded* in our interactions with others (Ochs, 1990) People use language, but rarely examine and contemplate their choice of words When addressing teacher beliefs, researchers have made distinctions between *professed* and *enacted* beliefs because teachers tend to make statements that appear to contradict what they do in practice Discourse analysis can uncover how issues of teacher positioning with respect to authority and knowledge are embedded in classroom practices (Herbel-Eisenmann, 2002; Morgan, 2002)

The third body of literature from which this project draws—practitioner research—builds on the other two areas of discourse and teacher beliefs Because discourse practices and beliefs are contextual, practitioner research is especially appropriate because it allows teachers to learn from their own classroom settings

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[2] While many countries have been advocating teaching mathematics for conceptual understanding and teaching mathematics for *all* students, I draw on the National Council of Teachers of Mathematics (NCTM) *Standards* (1991, 2001) documents in the US when I use the term "reform-oriented".

Guiding Literature

Discourse and Discourse Analysis

Cazden (2001) connects the study of classroom discourse to the study of a particular communication system: "The study of classroom discourse is the study of that [social relationships within the classroom] communication system" (p 2) She argues that, because of the changing nature of social and intellectual life, the study of classroom discourse is more important now than ever In fact, the issue she highlights more than any other is that of educational equity:

> Now, we understand better than we did [25 years ago]… that learning different patterns of language use—different 'ways with words'—involves more than words alone It entails taking on new roles, and the new identities they express—for students as well as teachers It has always been the case that formal schooling requires forms of discourse that are different from the informal talk of home and street The more different these forms are, the more attention we have to pay to helping *all* students learn to enact the new roles (p 6, emphasis added)

Many educational researchers who employ discourse analysis (DA) to study classrooms focus on either the sequential organization of lessons (e g , Mehan, 1979) or form-function relationships (e g , Halliday, 1978) More recently, educational researchers have turned toward critical discourse analysis (CDA) (e g , Rogers, 2002; Morgan, 1996) to focus more specifically on power and authority in school discourse A combination of these can be explored to provide a complex picture of classroom life

DA typically begins with creating timelines to develop an understanding of the ebb and flow of the ongoing events Mehan (1979), for example, described the hierarchical arrangements of lessons (i e , *lessons* can be broken down into *phases*, which are comprised of *topically related sequences* (pp 73-74)) The other emphasis in DA focuses on forms (which consist of particular words and how they come together) and functions (i e , what purpose those forms serve) The *predominant* forms and functions of the talk in the classroom can bring norms to the surface as they can appear in *every* class session and often multiple times throughout each class (Herbel-Eisenmann, 2000) These norms are mutually constituted and offer a concrete view of how discourse practices structure the participant's rights, roles, responsibilities, relationships, and expectations (Schiffrin, 1994)

While DA tries to describe what is happening, it does not highlight issues associated with authority or power CDA complements and extends the approach by focusing on "how language as a cultural tool mediates relationships of power and privilege in social interactions, institutions, and bodies of knowledge" (Rogers, 2002, p 251) CDA draws from traditions in discourse studies, feminist poststructuralism, and critical linguistics and presupposes that language is ideological rather than autonomous Asymmetries in power and knowledge are taken to be central, which makes this an important analytic methodology for studying classroom interactions where teachers, textbooks (and textbook authors), and students have the possibility of being viewed as being more or less powerful and more or less knowledgeable

The relevance of discourse analysis for educational researchers is that it: illuminates the structure of classroom lessons and the communicative competence of teachers and students; suggests how social context permeates the academic content of classroom conversation; provides insight into the hidden curriculum and into the relation of social life to the explicit curriculum; and provides information about discontinuities between norms for appropriate communication at home and at school (Florio-Ruane, 1987)

Researchers have only recently begun to bring DA and CDA perspectives to data from mathematics classrooms In some of this research, issues associated with social class, gender, and race are examined Focusing discourse studies on inequities can help us understand subtle differences between home and school contexts (Heath, 1983) as well as issues related to authority and power (Buzzelli & Johnston, 2001)—topics in mathematics education which are in need of further examination (Atweh, Bleicher, & Cooper, 1998; Zevenbergen, 2001)

Little work in mathematics education offers teachers or students the tools of DA or CDA to contemplate their classroom practices The scant literature that focuses on *teachers* who are teaching in ordinary classrooms (e g , as opposed to teachers engaged in teacher development experiments) highlight tensions between the social and mathematical aspect of discourse in practice (Nathan & Knuth, 2003) Teachers who worked with Rowland (2000) found his research on students' use of vague language helpful to their interpretation of students' mathematical understandings Those experienced teachers were involved in collecting data from their own classrooms to analyse student talk about mathematical ideas Drawing on Fairclough's call for critical language awareness, Wagner (2004) prompted *students* to become more aware of their language practices in mathematics class He found that students resisted the idea of linguistic reference to human agency, yet an examination of their language practices revealed that they did recognize human agency in their descriptions of doing mathematics problems Boylan (2002) argues that a focus on the classroom interactions can help us see how politics play out in mathematics classrooms

Beliefs

To achieve unconventional goals for teaching mathematics, teachers need to examine the conceptions they bring with them to the classroom Thompson (1992) argues that even if teachers' beliefs and conceptions have changed, the *mindsets* they have inherited as the result of being students and teachers in more conventional mathematics classrooms may not These mindsets can be embedded in and carried by the language teachers and students use, which can directly influence the norms and discourse that are negotiated in classrooms This focus on both social and cognitive aspects of interactions recognizes the reflexivity of beliefs and practice (see, e g , Cobb, Yackel & Wood, 1993) Teachers can be involved in examining their enacted beliefs as they appear in their discourse practices (Nathan & Knuth, 2003)

Thompson (1992) recommends drawing on philosophical works to help clarify the nature of beliefs and on psychological studies to interpret the nature of beliefs as well as an understanding of the function and structure of the belief system One set of conceptual and empirical research that has drawn on both kinds of studies is the work developed by Dr Thomas Cooney and his colleagues This conceptualisation of beliefs melds well with a discourse perspective in that it maintains that we need to examine more than just verbal exchanges: focusing on multiple contexts and forms of data is important to understanding the complexity of belief systems Cooney (2001) contends that it is important to think of beliefs as clusters of "dispositions to act, which include both utterances and actions" (p 21) The beliefs that teachers draw on (considering the range of beliefs one holds) depend on what is happening at that point in time and with the particular group of students with whom they are working Defining beliefs as existing in clusters is important when considering how beliefs can change In belief clusters there are *core* beliefs and *peripheral* beliefs Cooney and his colleagues (Cooney, 2001; Cooney & Shealy, 1997) argue that peripheral beliefs are the ones that are more amenable to change

According to Cooney (2001), there are two key elements involved in changing one's beliefs: *doubt* and *evidence* The particular evidence that can lead to doubt has not been closely examined in current literature Teachers can be involved in gathering evidence of enacted beliefs from their own classrooms, thereby determining what counts as evidence Having specific artefacts from their own classrooms can provide a form of evidence that may cast doubt on teachers' assumptions that their beliefs and their practices are closely matched By examining the prevalent forms and functions of the classroom communication system, the norms become more apparent These norms can be examined to see how a teacher might be undermining or promoting the kind of discourse she may want to establish Discourse analysis shows a key linkage between beliefs and practice Additionally, as Agudelo-Valderrama (2004) contends, we need "to focus on what teachers see as deciding factors when structuring their own teaching practices, and on *how* and *why* those factors impact their conceptions of their teaching practice" (p 44)

Practitioner Research

There is growing evidence that one of the most promising processes to encourage teachers to examine their beliefs and practices is through participating in a reflective process (Clarke, 1994; Schön, 1983) While reflection does not always require action, Jaworski (1998) points out that in some definitions of reflection, a key term is action *Practitioner research* is an overarching term that encompasses many traditions of teacher research At this point in time, we use this more generic term because the decision about which variation to use needs to be mutually chosen with the teacher-researchers (TRs) with whom we are collaborating TRs will be reading literature on action research and participatory action research One aspect of this project in which we are interested is the focus questions the TRs choose to pursue Across the various types of practitioner research, there are different goals In some cases, the goal is deeper understanding and fuller documentation of current practices; in others, there is a stronger emphasis on changing practices and answering research questions Although there are differences in goals, there are similar configurations that are employed and issues that are raised Practitioner research is based on experiential learning theory that although is

… inadequately described in terms of mechanical sequence of steps, it is generally thought to involve a spiral of self-reflective cycles of: planning a change, acting and observing the process and consequences of change, reflecting on these processes and consequences, and then replanning, and so forth (Kemmis & Wilkinson, 1998, p 21)

The reflective and cyclical process of practitioner research provides the mechanism for TRs to make connections between professed beliefs and discourse practices and to constantly challenge their enacted beliefs This cycle is seen as generative when it moves to the formulation of new problems (Schön, 1983)

The strengths of practitioner research are many because TRs learn within the context of their own classroom practice It has been shown to: obscure the boundaries between research and practice, increase content knowledge and change TRs stances toward their work (Feldman & Minstrell, 2000), result in teacher empowerment (Cochran-Smith & Lytle, 1993), and allow TRs to examine their beliefs (Doerr & Tinto, 2000) Atweh et al (2004) contend that the use of participatory designs will not only improve research but also make this research more helpful The use of practitioner research encourages reflection on and changes to teaching practices Teachers are asked repeatedly to change how they teach, but they rarely have worthwhile data that invites them to do so Although "some attention has been given to the personal and often transformative aspect of practitioner research, the

impact of such efforts on practitioners' basic belief structures… has been largely unexamined in the literature" (Zeichner & Noffke, 2001, p 308)

Working Toward A Collaborative Research Partnership

The work that we are about to embark upon draws on the literature described above In the last six months, the primary work for this project has been: (a) recruiting nine middle school mathematics teachers who are interested in focusing on their classroom discourse to be part of the partnership, (b) visiting their classrooms to get a general sense of the classroom environment and school and local context, (c) having informal conversations with the teachers about what they do in their classrooms, and (d) reading and synthesizing literature related to teacher beliefs, discourse, and practitioner research In May 2005, we will be hosting a retreat where all project participants will meet one another and begin to discuss and share their lives as people who are all interested in mathematics education and classroom discourse Due to space limitations, I now briefly describe the plan for the next four years

During the 2005-2006 school year, case studies of each middle school mathematics TR's classroom discourse will be developed and written with continual feedback from each TR (following the suggestions made by Hollingsworth (1994)) Across the school year, four full weeks of classroom observations will be done in each classroom (in September, November, January, and March) At that time, all class sessions will be videotaped and audio taped Artefacts from the class sessions will be gathered to provide information for the interpretation of classroom data Pre-observation interviews will take place with the TRs to inquire about their goals and plans for the lessons and to share any other information about the teaching/learning interactions that week Post-observation interviews will provide an opportunity for them to reflect on what happened when they interacted with the students on the focal mathematical ideas

The primary goals of the analysis will be to note both the overall structure of the events occurring and the recurring forms that appear in the discourse patterns Some language patterns appear not only every day but also occur repeatedly throughout each class session These prominent discourse patterns will be captured, identified, and transcribed after the first two weeks of classroom observations Additionally, CDA will be applied to uncover some of the asymmetries in the interactions In the third visit to the classroom, some of the repeating patterns will be shared with the TRs to get their interpretation of them We are interested not only in the interpretations of patterns by discourse analysts (the *etic* perspective), but also in the insider's perspective on their discourse patterns (the *emic* perspective) In past research, I used either transcripts or brief video excerpts to provide examples of the recurring patterns The teachers read or watched the examples and were then asked: *Have you ever noticed that you say this? If you had to name this, what would you call it? What do you think this interaction pattern does in your classroom? How do you think your students interpret this?* The interpretations provided by the TRs, along with available research, will be used to describe the functions of the forms in the classrooms As the case studies are developed, the TRs will be asked to provide feedback to make sure their voices are being honoured in the interpretation of the forms

In mid-2006, the project participants will take part in a series of book club discussions The books will focus on issues related to classroom discourse (e g , some of the books written by the Brookline teacher research group in Boston) and to doing practitioner research Afterwards, each TR will revisit the case study of his/her classroom discourse and will develop a research question to investigate We speculate that the research

questions might emanate from at least two places: (a) their case studies as they find characteristics of the classroom discourse that they want to improve, change, or use more intentionally; or (b) the book club readings as they find aspects of classroom discourse they maybe had not considered yet and want to explore further

During the following two school years (2006-07; 2007-08), the project participants will work together to complete a series of practitioner research projects based on the TR's goals for their students and classrooms Following Jaworski (1998), the research activities during this phase will occur on two levels: at the local- and the global-level University researchers (URs) will focus on supporting and working collaboratively with TRs as they accomplish their chosen practitioner research projects This will occur at the local-level In addition, we will be collecting data on what the group of TRs and the students, as a whole, seem to be learning in this process While many researchers have begun to address issues related to establishing criteria standards and validation processes in practitioner research (see, for example, the discussion on pp 319-322 in Zeichner and Noffke (2001)), classroom teachers need to assume a more central role in this process Discussions related to these issues will be part of our project meetings and data can be collected to help understand the teachers' perspectives about these topics

Finally, the TRs and URs will work together to develop materials to be used with other mathematics teachers, highlighting the complexities of doing action research and focusing on discourse in the context of mathematics classrooms Since these materials will not be developed for another four years, their form will be based on current knowledge about effective materials for teacher development at that time As Boaler (2003) points out, we need to do more than just communicate findings; we also need to create records of practice for teachers to conduct their own inquiries

Summary

This project attempts to address some of the issues raised by Shuck and Grootenboer (in press) about affective dimensions in mathematics classrooms: by using practitioner research to engage in changing and improving discourse practices, teachers can disrupt practices that may not be maximizing opportunities to learn mathematics, particularly for students who are historically underrepresented in mathematics By collecting evidence of their own discourse practices, TRs can investigate their enacted beliefs in the context of their own classroom Practitioner research provides the space needed for TRs to investigate the social influences in their classrooms

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