FACILITATING ENCOUNTERS AMONG TEACHERS WITH REPRESENTATIONS OF TEACHING: TWO REGISTERS

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We report on the management of teacher study groups designed to elicit the practical rationality of mathematics teaching. These study groups appeal to practitioners as occasions for professional development yet are deliberately designed as research instruments, as catalysts of the often-implicit norms and dispositions that sustain mathematics teaching in secondary school. The dual purpose of these groups makes them amenable to tensions comparable to those that are endemic to teaching itself. Those tensions were handled by having two facilitators invested of different personas and agendas—a moderator and a researcher. Excerpts from these sessions are used to argue that these dual-facilitator sessions create a context for a conversation that can be described as interweaving two different registers.

Introduction

Project ThEMaT (Thoughts Experiments in Mathematics Teaching) aims at collecting the practical rationality (Herbst & Chazan, 2003) applied in the teaching of geometry and algebra in secondary schools. We seek to reveal that which shapes what teachers consider viable to do in selected instructional situations: The tacit norms or tendencies around which practitioners make instructional decisions and the dispositions (categories of perception and value) that moderate the way they relate to those norms. For this purpose ThEMaT gathers once a month four different groups of secondary school teachers; two in geometry and two in algebra. In these meetings the participants encounter representations of teaching: Animated classroom scenarios that sketch stories of classroom mathematical work, created to bring to surface specific, hypothesized norms of teaching. Study group members discuss these representations as well as other issues they raise in response to those representations of teaching. The meetings have for us a research purpose, to elicit the practical rationality of teaching under the assumption that instructional situations contain tacit, regulatory elements that all practitioners come to relate to by virtue of their socialization into the work of teaching a course. Yet the meetings also cater to the self interest of individual participants insofar as they have the chance to share individual experiences with colleagues, perhaps finding common ground over a background assumption of

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individual differences (in work settings, style, preparation, etc.). The success of these study groups as catalysts for research data requires us to deliberately seek the success of these study groups as places for individual expression and growth. This report is a methodological contribution to the study of teaching that builds on our work designing and sustaining those study groups.

Two project members, a moderator and a researcher, jointly facilitate sessions, each appropriating a specific persona and pursuing a specific agenda. We appoint moderators who come to the encounter fully entitled with their experience as teachers of geometry, not only in what they presume to know but also in what they forget to question. Their responsibilities include creating a welcoming, accepting environment for teachers to feel contained as individuals, free to express their ideas and share their stories within a flowing conversation. The researcher appropriates a different persona, deliberately apportioned of the learned naiveté (or the habit of estranging the familiar) of an observer. Researchers in our study groups take responsibility for making abstract connections or contrasts across participants and exercise the right to propose general statements about which teachers are expected to take a stance. Our study groups have succeeded in satisfying both missions of research and professional development. The pursuit of those two agendas is done through a conversation that knits two different registers, that of the moderator and that of the researcher.

The facilitator(s) of study groups: PERSONAS and AGENDAS

The role of the facilitator of a video study group is widely discussed in literature (e.g. Levin, 1999; LeFevre, 2003). Often the role of the facilitator is presented as two folded - creating a comfortable environment for the participants to engage in discussions, and yet, having those discussions meets the goal of the study group as far as the topics discussed and the level of conversation. Tensions related to this dual purpose have been acknowledged (e. g. Lampert & Ball, 1998; LeFevre, 2003), and they parallel important tensions of teaching. Research on teaching (e.g., Ball, 1993; Herbst, 2003) has uncovered some of the tensions that a teacher experiences when they make use of students' engagement in authentic tasks to teach about specific mathematical ideas. Often the curricular goal of one such task cannot be disclosed at the onset of the work but is to be found as students work toward another, ancillary goal. Yet the effectiveness of such work requires a skilful negotiation of the didactical contract. In that context a teacher can experience a tension regarding how to direct students' activity, where allegiance to students' goal-oriented thinking compels a teacher to follow their take, away from the goals underlying his initial choices; and allegiance to the curricular goals of the task compels a teacher to steer students' work away from ideas that they have legitimately developed. Our study groups are not designed after instructional goals like mathematics lesson often are, rather our choice of representations of teaching and of conversation triggers are based

on an agenda, yet they keep the elements of that agenda under a similar opacity as authentic tasks do to the goals for which those tasks are chosen.

When we designed our study groups, we foresaw the tensions a facilitator might experience if they were responsible for the dual goals of research on the rationality of teaching and professional development of individual teachers. We feared that a sole facilitator might fall prey to either keep the conversations at the level of the narratives in which practitioners often store their personal practical knowledge (Clandinin & Connelly, 1987) or, if they pushed the conversations to find the general in the particular, they might risk alienating themselves from the group of practitioners (whose communicational code they might thereby come across as ignoring). We handled those contradicting goals by assigning two project members to facilitate the sessions and characterized them as different personas: The moderator is introduced as a geometry teacher and she takes the personal practical knowledge of the individual teacher at face value. As the main facilitator of the sessions, the moderator seeks to engage the participants in a conversation where individual narratives are exchanged and takes responsibility for the continuity of the group interactions, including the following of participants' emerging interests. The researcher, in contrast, is introduced as one who, while knowledgeable of the practice of the participants, does not walk on their shoes and thus affords the time and the perspective to question what in the eyes of the participants might be so obvious as to go without saying. The researcher assumes that personal narratives are more than stories but rather ways of storing and organizing the tacit knowledge of the profession. For the researcher to publicly identify what each story takes for granted or to challenge practitioners to take a stance vis-à-vis any one story is instrumental to bringing about the rationality of teaching. Yet these moves can contribute to project an image of detachment and naiveté. In contrast with Tochon (1999, p. 64), our researcher and moderator are both members of the research project. They collaborate in planning the sessions, but they work autonomously during the sessions, mindful that each has to achieve separate, complementary goals and that those might call for adversarial tactics.

Studying the registers of the researcher and moderator

Our attempts to manage study group encounters by way of sharing the facilitation work between a moderator and researcher have created a context to observe the intertwining of two conversation strands, articulating different registers. We describe them as the weaving together of a strand whose speakers are *"you"* and *"I"* and another one whose speakers are "*we*" and "*one*."

Although the goal of achieving a shared language and culture is emphasized in the literature, the register of the moderator is not sufficiently addressed (Levin, 1999). Most of the literature that addresses focus group research concentrates mainly on

technical issues or the topics addressed. Some studies do focus on the interactions that unfold in focus groups. Some of them study the interaction between participants (e.g., Myer, 1998), others the relationship between the questions and remarks asked by the facilitator and the number and type of responses provided by the participants (e.g., Nemirovsky & Galvis, 2004), and others study the language used by the facilitators as it is used to achieve the specific purpose of the study group (e.g., Le Fevre, 2003). However, none of those address the interactions of study groups that have the kind of dual agenda we have. We are interested in understanding to what extent having a two-person facilitation team helps achieve both goals.

One way to examine whether and how the dual goals of the study group are realized in practice is by looking at the registers that are employed in the conversation. We use the word *register* as described by Halliday, "a set of meanings that is appropriate to a particular function of language, together with the words and structures which express these meanings" (1978: 195); a register is a variation of language, which is specific to its use in a social situation. According to the systemic functional model, "three metafunctions are considered necessary for an adequate description of language: (1) interpersonal, (2) textual and (3) ideational" (Hasan & Perrett, 1994). Of particular interest for us here are the ideational and interpersonal meanings that are represented by what Halliday called the field and tenor variables of the social situation. The *Field* of discourse may be thought of not simply as the subject matter but as the institutional setting of the activity in which a speaker and other participants are engaged (Morgan, 2002); the *Tenor* refers to the roles and personal relationships of particulars in the social activity and includes power, feelings, and attitudes (Halliday, 1978; Chapman, 2003).

Focusing on the ideational meaning, we describe the topics that the speaker chooses to discuss, not only the mathematical or didactical issues, but also whether they talk about the viewed animation, about personal experiences, or about community practices. We address those questions by identifying the participants, processes and circumstances in the spoken clauses, as well as the prefacing of clauses, which are realized by projective clauses (Williams, 1999). We exemplify this by using the following utterance, which was asked by a moderator of a study group, after the participating teachers have raised the issue of using hands-on activities in their teaching of theorems: "in your classrooms, … would you let your students make some drawings, do some hands-on activity before going into the proof?". The participants of this clause (and its preface), *you* and *your students* as well as *drawings* and *hands on activities*, describe what the moderator talks about. The circumstances *in your classrooms* suggests that the moderator addresses the teachers' own practice and *before going into the proof* points to the specific timing that the hands on activities are used. The process *let* suggests that the moderator draws on her beliefs

regarding the authority of the individual teacher to be the one who decides what is appropriate for her students to do in her class.

With regard to the interpersonal metafunction, we address the mood (the type of turn) and modality of the clause. An analysis of the mood includes differentiating among statements, questions, exhortations, etc. and then categorizing each of the groups. We build on Ghousseini's (2005) review of the literature on teacher's moves while managing classroom discourse and adapt it for examining the facilitation done by the moderator and researcher. Statements are categorized as (1) Revoicing, including statements that repeat, replace, summarize, elaborate, and translate what participants say (O'Connor & Michaels, 1996; Forman & Ansell, 2002); (2) Orienting, including statements that encourage participants to listen to and attend others' ideas (O'Connor & Michaels, 1996) or towards a particular contribution of an outsider thus redrawing the classroom geography; (3) Negotiating the norms in the relevant community, including moves that are used to ascertain the value that can be attributed to statements and questions; and (4) Modeling, which includes statements that aim at making the nature of the discourse (in our case the discourse of teaching) explicit. Questions are classified as requests for (1) elaboration; (2) clarification; (3) alternatives; (4) reason for a suggested action. The excerpts used to exemplify our points belong to meetings of one geometry study group that included nine teachers from nine high schools ranging from rural to urban in the American Midwest.

The registers in one study group

We describe the registers of the moderator and researcher in one study group as they result from our examination of transcript data using the questions listed above. The moderator, attentive to her goal to manage a session that is subservient to professional development, focuses her interventions on teachers' narratives and individual differences. She normally remains nonjudgmental as to the different stories shared by practitioners. The moderator's statements are more likely to play orientation and revoicing functions; with them the moderator creates relationships among participants, encouraging them to share with and attend to one another. Her questions are usually requests for elaboration or more detail of what transpired in the personal stories told. When she asks for alternatives, the question presupposes that in a similar situation different teachers might choose to act differently.

The researcher, attentive to his goal of finding the general in the particular, responds to teacher narratives by making general comments about teaching, pushing teachers' personal narratives to become stories that could be shared by their professional community. That is, while the moderator is more likely to orient participants to attend to each other's contributions, the researcher is more likely to orient the participants to a voice from outside the group, a modal teacher of sorts who might relate to each and

everyone of the stories shared and many others. The search for the norms that describe what and how things are normally done in class often compels the researcher to inquire on what might seem obvious to participants. For example, participants react better to the researcher's use of *why*-questions than what they do to the moderator's: Whereas the latter might be interpreted as a reproach or critique, the researcher's habit of asking for the obvious makes his why-questions acceptable as legitimate requests for information. Likewise, when the researcher hears differences amongst practitioners or ideas contradicting the naïve assumptions he might have, he brings them to the surface as conflicts whose resolution needs to be negotiated.

The researcher can be selective with regard to the topics he wishes to react to. He is free to and takes the chance to react to comments that were said at any earlier time, and can step out of the conversation selectively. Instead, the moderator is more likely to address topics in the order they occur. She rarely returns to attend to comments made earlier, which understandably might conspire against the conversation's flow. Let's consider the following excerpt as an example of a shift from talking about individuals and their stories to talking about teachers as a community of practice:

1 EA: Well, no, I think investigating the wrong… If someone came up with a conjecture that you knew was going to be wrong I don't think there's anything wrong with investigating that. …

2 M: Would you follow… if a student came up with a wrong idea, would you encourage him to continue explaining the idea in class?

3 CH: Depends on how long. If it took 10 minutes, no I'd stop him eventually. But if it's a couple minutes, for him to say, Oh wait no it's not, it probably cemented in his brain oh wait no it's not, it's this way.

4 R: I see three different ways one could go about this…

5 TA: Trial and error, I mean, that's how they learn a lot of things…

The participants are discussing whether to follow an idea they know is wrong. The moderator appeals to their style ("Would **you** encourage **him**…?"). In turn 3, a teacher says what she would do ("**I**'d stop him"). The researcher jumps in, no longer speaking about any individual teacher, but rather about a range of possible reactions for any teacher ("[about] ways **one** could go…"). And the teacher's response to the researcher is then one about students in general ("that's how **they** learn …"). Both the moderator and the researcher speak of the same topic and react to recent speakers, but as the moderator seeks narratives, the researcher seeks norms by making a comment regarding the entirety of possible actions on behalf of the teacher, hoping to elicit reactions from the teachers about what a "modal" teacher would do. The following interaction shows the shift of a conversation from individual stories to general statements about teachers and students.

1 M: So what do you think … in your classrooms, … would you let your

students make some drawings, do some hands-on activity before going into the proof? or just prove what you said? …

2 MC: I think you do. …

3 M: Why do you like it? What do you think you achieve or your students achieve by this hands-on activity?

4 MC: Cause I think that there's lots of misconceptions out there that we're totally unaware of. ...

5 …

6 GN: And this would be a perfect way to show it, to prove it another way.

…

7 PS: Well I believe that we always have to give some concrete example because for too long we've accepted you know theorems and postulates...

8 M: So it helps them accept that the theorem's true.

9 R: So but, the risk with that is that maybe they don't see any need for the proof afterwards. If they already know that it's true by…experience.

10 MC: Well kids say already, well we already know this is true because this is what we're trying to prove so why do we have to prove it? I mean I have kids that in geometry classes think it's pointless to do all these proofs because these proofs have been already proved. So we're reproving proofs! So I mean that's kind of the same argument that you're just stating.

11 R: Yeah you're sort of making an argument against mine, [like] "anyway they know it's true because it's a theorem."

12 MC: But I think the paper folding and the manipulation gives them things to start looking in a direction of something they could prove.

Some teachers had thought of using paper folding to illustrate a theorem after it had been introduced and before proving it. In response, the moderator appealed to their experiences with hands-on activities in teaching theorems, while the researcher tried to learn whether this type of activity might breach any implicit norm that regulates how theorems are usually installed. The moderator turns to all the participants, asking about their personal experience ("in **your** classrooms…", would **you** let **your** students…"). The researcher probes what teachers have said, by proposing a possible inconvenience. The teacher suggests that what she says is "kind of the same argument that you're just stating," but the researcher takes distance, stressing the conflict. While the moderator asks participants to share their own stories, the researcher raises a general conflict, seeking for the norms and dispositions behind those stories.

Discussion

The two facilitators of a study group, each with a unique persona and role, help

achieve the dual purpose of research and development. The analysis of the register of these players shows that they seem to be pushing participant teachers to respond to different issues. Yet their apparent competition for attention serves the common purpose of on the one hand making individuals contribute and on the other hand inquiring on general aspects of a teacher's work.

The elicitation of practical rationality is achieved in cooperation. The animations prompt teachers to raise issues with regard to those stories (talking about the animated episodes), the moderator's questions shift the conversation to talking about the teachers' own experiences that relate to those stories, and then the researcher, shifts the conversation to one about what is usually done in classrooms and why.

"Focus Groups" authors Krueger & Casey (2000) write, "naïveté is a two-edged sword. In some circumstances, it elicits considerable new information … Unfortunately, this same tactic can become infuriating to knowledgeable participants who feel the moderator has not yet earned the right to ask questions." (p. 99). The researcher, being an outsider to the community of teachers, can inquire about issues that the moderator, who introduces herself as a geometry teacher, cannot allow herself, without taking the risk of alienating herself.

References

Ball, D. (1993). With an eye on the mathematical horizon: dilemmas of teaching elementary school mathematics. *Elementary School Journal, 93* (4), 373-397.

Chapman, A. P. (2003). *Language Practices in School Mathematics*. A social Semiotic Approach. The Edwin Mellen Press.

Clandinin, J., & Connelly, F. M. (1987). Teachers' personal knowledge: What counts as "personal" in studies of the personal. *Journal of Curriculum Studies, 19,* 487-500.

Forman, E. & Ansell, E. (2002). Orchestrating the multiple voices and inscriptions of a mathematics classroom. *The Journal of the Learning Sciences, 11*, (2&3), 251-274.

Ghousseini, H. (2005). Forms of Teacher Participation in Classroom Discourse. Manuscript. University of Michigan

Halliday, M.A.K. (1978). *Language as social semiotic*. London: Edward Arnold.

Hasan, R., & Perrett, G. (1994). Learning to function with the other tongue. In T. Odlin (Ed.), *Perspectives on Pedagogical Grammar* (pp. 179-226). Cambridge Univ. Press

Herbst, P. (2003). Using novel tasks in teaching mathematics; Three tensions affecting the work of the teacher. *American Educational Research Journal,* 40, pp.197-238.

Herbst, P. & Chazan, D. (2003). Exploring the practical rationality of mathematics teaching through conversations about videotaped episodes. *FLM*, 23(1), pp.2-14.

Krueger, R. A. & Casey, M. A. (2000). *Focus Groups*. Sage Publications Inc.

Lampert, M., & Ball, D. L. (1998). *Teaching, multimedia, and mathematics: Investigations of real practice*. New York: Teachers College Press.

LeFevre, D. M. (2003). The work of designing video based multimedia curriculum for learning teaching. Doctoral dissertation. The University of Michigan.

Levin, B. B. (1999). The role of the facilitator in case discussions. In M. A. Lundeberg et al. (Eds.). *Who learns what from cases and how?* Mahwah, NJ: Erlbaum.

Morgan, C. (2002). What does social semiotics have to offer Mathematics education research?, Paper presented at the *26th Conference of PME*, Norwich, UK.

Myer, G. (1998). Displaying opinions: Topics and disagreement in focus groups. *Language in Society* 27, 85–111.

Nemirovsky, R. & Galvis, A. (2004). Facilitating Grounded Online Interactions in Video-Case-Based Teacher Professional Development. *Journal of Sci. Educ. and Tech.*, 13(1).

O'Connor, M.C. & Michaels, S. (1996). Shifting participant frameworks. In D. Hicks (Ed.), *Discourse, learning and schooling* (pp.63-103). Cambridge: Cambridge University Press.

Tochon, F. V. (1999*). Video Study Groups for Education, Professional Development and Change*. Atwood Publishing. Madison, WI.

Williams, G. (1999). The pedagogic device and a production of pedagogic discourse: a case example in early literacy education. In F. Christie, (Ed.), *Pedagogy and the shaping of consciousness* (pp.88-122). Continuum press.