POSITIONING THEORY AND INTERCULTURAL CONVERSATIONS ABOUT MATHEMATICS

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INTRODUCTION

> Walking along a forest path with an Aboriginal teacher, I listen as he tells me about mathematics done in his community. Trying to be helpful, he asks me yet again, "Am I telling you what you want to hear?" In the background, I notice his wife using mathematics without fanfare to measure the depth of a puddle for their son.

There are multiple actors involved in any research situation. It is never straightforward to understand how they relate to each other in the development of mathematical ideas. In this paper I use Harré and van Langenhove's (1999) positioning theory to consider situations related to my ethnomathematical research in Aboriginal communities on Canada's east coast.

THEORETICAL FRAMEWORK

In Harré and van Langenhove's (1999) edited book, the general description of *positioning* refers to the way people use action and speech to arrange social structures. This positioning theory claims that, in any utterance, clues in the word choice or associated actions evoke images of known storylines and positions within those stories. For example, a teacher may say something to position herself as a coach and the student as a motivated athlete. The student may continue the interaction either complicit with this positioning or resistant to it.

For considering positioning, Davies and Harré (1999) focus interpretive attention on 'immanent' practices, in contrast with the common scholarly focus on 'transcendent' discourse structures. Using Saussure's distinction between discourse practice and the discursive systems in which they are situated, they differentiated: "La langue is an intellectualizing myth—only la parole is psychologically and socially real" (p. 32). Though this approach focuses attention appropriately on human interaction, I note that myths are the stories people live by, and thus have power and are in a sense real. Unlike Davies and Harré, I consider the discourses of mathematics and colonialism, for example, as real. Like Davies and Harré, I recognize that human interactions are more real and less resilient to revisioning. I claim that there is emancipatory power in focusing on real interaction and ignoring transcendent discursive systems.

APPLYING THE FRAMEWORK TO RESEARCH CONVERSATIONS

Taking the view that people position themselves using various storylines, I will consider three developing conversations, which relate to each other.

First Steps

In the opening quotation, I described a part of my ethnomathetical field work. I had invited this particular teacher and his family to walk with me in the forest to talk about mathematics practices (both traditional and current practices) in their community. He was trying to be helpful by telling me what I wanted to know. I was grateful for this spirit of cooperation because it would be generative for the research, which could be used to create culturally-appropriate resources for students in his and other communities. However, I was a little disturbed that he kept asking me if he was telling me what I wanted to hear. On reflection I recognized two concerns: 1) I did not see myself as the ultimate audience of his observations but he and I both positioned me as his audience, and 2) I worried about authenticity because he was subjecting himself to my agenda and we did not talk about his agenda(s).

Thinking about our conversation in terms of participants, I envisioned something like the diagram in Figure 1. In it I refer to this teacher as a community representative: he held community honours that recognized his knowledge of traditions. The people I refer to as being outside the community include a wide range of people, including scholars, teachers in Aboriginal schools, and Aboriginal students. Constructing this map of positioning led me to realize that I was seeing knowledge as a thing. Perhaps the context of conversation in an Aboriginal community invited this storyline because of stereotypical storylines that relate to ‘keeping traditions’, ‘loss of language’, and ‘elders passing on their knowledge’, all of which use nouns to refer to knowledge and tradition and use metaphors of possession and transactions. I believe that the teacher’s language, Mi’kmaq, would not use these metaphors because the language is far less noun-intensive than English.

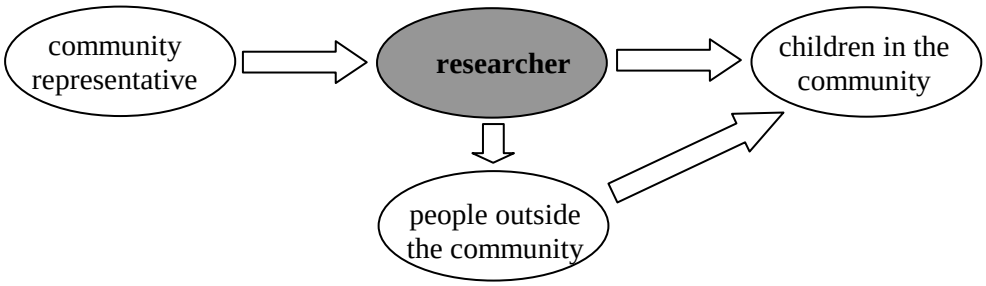

Figure 1: A representation of the initial ethnomathematical storylines

In the diagram, I highlight my position as the researcher to indicate my privileged agency. The teacher was telling me what I wanted to know (and reminded me regularly of this fact). According to this storyline, I would decide what and how to pass this on to people outside the community and to the children in the community. But it was not my intention to be controlling. Though in any situation every participant has the opportunity to exercise agency, the way I positioned myself at the centre of this conversation positioned other people in roles that seemed to have limited choice—primarily the choice to follow my storyline or not, complicity or

resistance. Though this situation generated some good things, the enacted storyline, to my embarrassment, was reminiscent of our region's colonialist history – a distasteful storyline: yet again, an outsider and his agenda are welcomed in a generous and patient community.

As predicted by Harré and van Langenhove (1999), attending to positioning opened up new opportunities. First, I thought I should remove myself as middleman or medium of the transfer from elder to children. Second, when reflecting on Morgan's (1998) research that underscores the importance of audience in students' mathematical writing, I realized that positioning the children as the ultimate audience in the ethnomathematics conversation affords them no opportunities to address an audience other than their teacher, and certainly no imperative to engage in real problems/issues faced by their community. New storylines were necessary.

Changing Storylines

In conversation with my graduate student Lisa Lunney Borden, who had worked for 10 years in this community, we built on a relatively new storyline in Canadian Aboriginal communities. As part of the tradition of storytelling, elders and others share stories and other forms of knowledge with other communities across the country in 'contests', using the internet and realtime video conferencing. We gathered teachers and elders from some communities to plan a contest called "Show Me Your Math," in which children would be invited to do ethnomathematical investigations to show others the mathematics in their communities.

In order to break the school tradition of students doing work for teachers as audience, we produced a video prompt that described the parameters of the contest. It featured Aboriginal people, including an elder, a middle-aged teacher, and children, all asking the viewer (the student) to "show their math." In response to this prompt, school children interviewed elders, experts in crafts and others to explore mathematics that has been done in their communities' traditions and also more current mathematics in their communities. They published their work on the internet site used for the other 'contests' on which we modelled this contest. Students also presented their work to the region's communities in a math fair.

Figure 2 represents my view of this set of conversations, though not as well as the previous diagram did for that conversation. This conversation was much more complex, and I had much less control and access to the related conversations. As researchers, Lisa and I positioned ourselves in reciprocal relationships with people in the community by setting the conversation in motion, allowing the many conversations to take their course, and trying to observe as much as possible. In this cloud of agency, there were multiple conversations, each of which included the negotiation of intentions. Elders and other representatives of the communities had things to tell their communities' children. Children wanted to listen, and it became obvious that the more they heard, the more they wanted to hear. We, as researchers,

wanted to hear what elders, children and others valued in their conversations and we were interested in the collection of ethnomathematical research being compiled by students. The children and others in the community eagerly accepted our invitation for them to talk to each other. Furthermore, we all positioned ourselves in relation to people outside the community. Students presented their findings on the internet (see http://schools.fnhelp.com/math/showmeyourmath/Studentwork.htm), and we as researchers are reporting on this conversation to scholars and other educators.

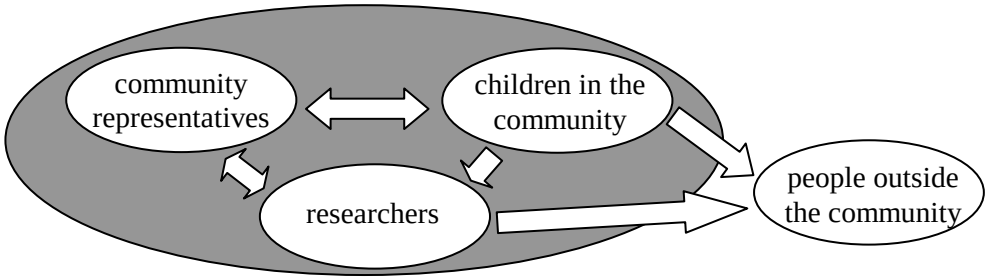

Figure 2: A representation of the "Show Me Your Math" storylines

Challenges of Representation

In our reporting on this research, the positioning theory lens helps identify further concerns. We have experienced enthusiastic audiences in our reporting, but we worry about the storylines enacted by our audiences. We become aware of these storylines from the questions and feedback received by scholarly peers. For example, a colleague within the larger research project with which this research is associated wanted me to use the students' ethnomathematical work to compose some problems for his online mathematics problem-solving community.

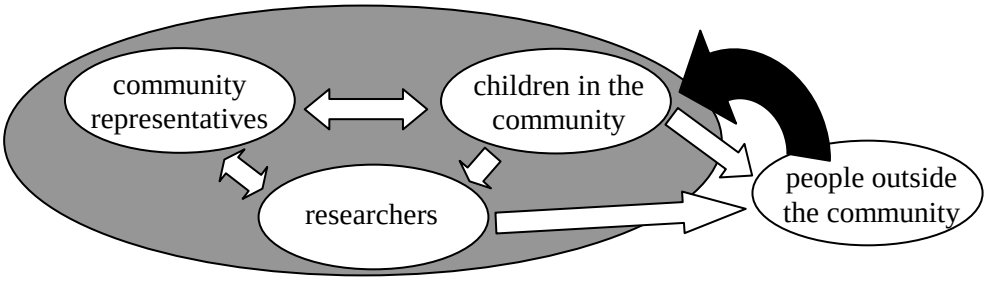

Figure 3: A representation of inescapable storylines

There are significant dangers in representing Aboriginal community practices outside their communities. First, and most important because our ethical responsibilities trump all other concerns in the research, we know that Aboriginal people in Canada are very concerned with the way they are represented outside their communities. Second, we share their concern ourselves and identify real dangers their communities face related to the images that feed stereotypes. There is the danger of essentialization. People reading a question taken from student ethnomathematical work may take it as representative of all Aboriginal communities, or of all Aboriginal responses to the particular situation addressed. Aboriginal people, much

to their detriment, have had and continue to have storylines attributed to their lives by outsiders in this way.

Ironically, this problem of representation is exacerbated by an emerging ethic of inclusion. School textbook publishers, clearly with good intentions, set standards for their books to include minimum percentages of representation of Aboriginal people in their images and word problems. The reality for authors and visual editors is that to meet these quotas they need to choose images and examples that are recognizably Aboriginal; to be generally recognizable, these typically include stereotypical associations. How then can a public view of Aboriginal people and their mathematics break free from these stereotypes?

In Figure 3, I reuse the second diagram adding a reversed black arrow connecting the children in the community to people outside the community. What outsiders think about a community has a great impact on the children (and others) of that community. However, even if Lisa and I did not report the ethnomathematical work done by the students, people outside the community would be positioning the community. We just have to be careful. Further, with our privileged understanding of the world outside the community, we have the responsibility to warn community leaders of the dangers of misrepresentation, and the opportunity to work with these leaders to find ways to avert negative misrepresentation.

REFLECTION

It is inevitable that people position each other in their relationships. One way to avoid being positioned by others is to avoid relationships between individuals and between communities. I believe that there are greater dangers in isolation. I am suggesting that there is significant value for mathematics educators to consider how they are positioning themselves and their students.

Asking questions such as the following may be a good way to begin:

1) To whom are my students reporting their mathematics?

2) Whose problems/needs are my students addressing when they do the tasks I assign them?

3) How are people and communities represented in applications of mathematics I introduce?

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