

IDENTIFYING STORYLINES WITH INDIGENOUS AND NEWLY MIGRATED MATHEMATICS STUDENTS

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In this methodological paper, we describe our approach to engaging middle school students in identifying storylines at work in their experiences of mathematics learning. Storylines are an important part of the theorization of positioning but they are underexplored. Our focus is on students who identify (or are identified) with groups that have often been marginalized, namely Indigenous students and students who are newly arrived migrants. It was important for us to garner the trust and also the interest of students while guiding them to conceptualize storylines so that they are the ones identifying the storylines that impact their experiences. In the presentation we will share more data.

Keywords: Equity, Inclusion, and Diversity; First Nations and Indigenous Cultures

Student experiences of mathematics learning have been investigated using the theorization of *positioning*. Indeed, it is important for educators to understand how students understand themselves as learners and how they understand their actions. Students are positioned by teachers, classmates, media, community, organizations, language constructs, and families, through current and historical practices. We are particularly interested in the positioning of students who identify (or are identified) with groups that have often been marginalized, namely Indigenous students and students who are newly arrived migrants.

A focus on storylines

Most research using theories of positioning focuses on the positioning (e.g., Drageset, 2024, Sengupta-Irving, 2021; Tait-McCutcheon & Loveridge, 2016). However, the tradition referred to as positioning theory sees a triad at work in human interaction, including the three elements of positioning, storyline and speech/communication act (e.g., Harré, 2012; Herbel-Eisenmann, 2015). A storyline is a story known to a participants in an interaction. The people in the interaction are associated with positions in the story, which guides the people's choices about how to interact. Storylines are important because they provide the repertoires for action for mathematics students. The storylines available (known) to students and their teachers make certain positions possible, and they exclude other positions from possibility.

As far as we know, the research that focuses on storylines in mathematics education research investigates common stories that appear in public discourse (e.g., Andersson et al., 2022; Chorney et al., 2016; Herbel-Eisenmann et al., 2016; Rodney et al., 2016)—namely news and entertainment media. In our research project we work with Indigenous and new migrant students and aim to identify the storylines at work in their mathematics learning environments. In this paper, we describe how we have gone about doing this, noting the principles we embrace, the challenges we experience, and results of our choices. This is a methodological paper.

We do not yet have detailed data sufficient to share in this paper, but we expect to have data to share for the conference. In this paper we describe our methodological choices and how they manifest in our interactions with participants. The research aim is to identify storylines, animated with accounts of student experiences. We will next share these with teachers and work with them to develop alternative pedagogies that build on student strengths and experiences. (We have

some detailed data already including accounts of student experiences, but to honour our anonymity promises, we cannot yet publish any of the accounts of experiences because that would make it possible for some people to identify the students who told us of their experiences.)

First context: Conversations with Indigenous students

Our research project is situated on the traditional unceded and unsurrendered territory of Wolastoqiyik and Mi'kmaq peoples (often marked on maps as part of eastern Canada). Since colonization, the majority of people living here have been settlers, and there has been a recent surge in settlement with the general upswing in global human migration. Given the history of terrible experiences at the hands of settler people and colonizing institutions, it takes time and care to develop a relationship of trust with Indigenous students.

In the first context of our research project, Dave (the first author) worked with a teacher who, for more than a decade, has worked as a support teacher for the Indigenous students from a local Wolastoqiyik community. We note that this teacher's endorsement and collaboration accelerated the students' willingness to speak openly about their experiences (i.e., to trust). In other words, trust can be shared, to some extent, from an already trusted person. Of course, the teacher was willing to endorse and collaborate with us based on our past interactions (also a development of trust). We also drew on the teachers' knowledge of the students to decide on an approach to interaction, and thus decided to work for some time with a group of students (about 8 middle school students) in a series of six biweekly one-hour meetings. The group felt safe when they were all together, so dividing them up probably would have undermined that sense.

In the first interaction Dave briefly described to the students what we hoped for in the research, and taught the students a game he learned from a Mi'kmaq student in a previous research project. The game play would develop relationship, and the Indigenous source of the game showed students that Dave had interacted with other Indigenous students before, attentive to their cultural heritage. Once we started the interactions focused on identifying storylines, we needed to find a way for students to understand the concept of storyline. How to do that was not straightforward, given that Dave and others in a sister research project (with some of the same research team members, also with a similar focus on storylines associated with Indigenous and newly migrated students, but in Norway) have been finding it challenging how to describe a storyline, as discussed in Simensen et al. (2022). The theory work on positioning has not been very helpful, and the paucity and inconsistency of examples of identified storylines in research has led to questions about how to describe storylines and how to name them. Should they be full sentences? Can they be described with a few words like a theme? Those questions persist.

In the interactions, the approach that we settled into as productive (in terms of garnering quantity and quality sharing from the students) had Dave asking what has happened recently in math class or relating to the math they did in math class. After a student identified something that happened, then Dave probed with questions about what is "really happening" when things like that happen. Using the triad of positioning theorization, the happening is a communication act or a series of communication acts, and the description of what is really happening is the storyline. We discussed questions like "Why would [the person] do that?" Dave probed for other similar experiences. It was very productive to compare the happening to parallel happenings outside of school math. For example, when students talked about feelings of success or failure it was helpful to consider feelings of success or failure in other contexts—which tended to be sports contexts, probably because of the passions of the most readily vocal among the students. Or, when talking about feelings within interactions with people in math class, it was productive to consider how that was different from interactions among friends.

After this series of group conversations, the next step was for us to synthesize the stories and dialogue over the hours of interaction and bring them back to the students. The teacher arranged for each student to meet Dave individually, but it was hard to decide how to conduct those interviews. After Sacha and Dave discussed the deep knowledge emerging from the recorded interactions, Dave synthesized the foci with the following storylines:

1. We have to try hard to learn math.
2. Teachers respond to students differently based on the students' reputations.
3. Math is important.
4. The math we do in school is not interesting.
5. We are more worried about failure than attracted by success in math.
6. How I feel about my math performance depends on my expectations for myself.
7. Math teachers don't understand native people [i.e., Indigenous people].
8. Math should be done in silence.
9. Something about parents... <not sure what>

In the interviews with individual students Dave told them he made a list of storylines from the conversations we had had. He said he would read them one at a time, and ask for example stories that illustrate those storylines. For #9 he said that there was a lot of talk about parents but he could not identify a storyline succinctly. He asked each student if they could say what the storyline might be. The fourth of the students (the most shy among them) provided a storyline: "Parents expect you to do well." After this, Dave replaced #9 with the student-provided storyline. Also with the first few students it became clear that #5 and #6 were not like the others. Students said they were not sure about them. Emerging from those conversations, Dave learned that it was helpful to ask them if they thought the statement is true, or if they thought the statement is something people say or think. For #5 and #6 almost all the students said the statements were true (not surprisingly: these emerged from our earlier interactions) but that they were not statements that people think or say. Thus, we see that they are not storylines: they are not known stories. This reminds us that storylines do not have to be true to be well known. And their power is independent of their truth. The students provided rich accounts of the storylines, some of them repeated from earlier interactions. We look forward to reporting on the storylines illustrated by particular experiences. As noted, to protect anonymity we cannot do this yet.

Following the principle of OCAP (ownership, control, access, possession), "First Nations have control over data collection processes, (...) they own and control how this information can be used" (<https://fnigc.ca/ocap-training/>). Thus, for the learning from our interaction with the Wolastoqiyik students, they themselves and their community are the most important people to report to. Sacha (the second author) identified a knowledge keeper (a.k.a., Elder) from the students' community as a person to report to first, and the teacher endorsed this choice. Dave spent a couple hours with the knowledge keeper to report on what happened thus far in the research conversations, including the specific storylines discussed most recently in individual interviews. Dave did not tell the knowledge keeper about the experiences shared by students, but the knowledge keeper already knew the general nature of those experiences (knowledge keepers know things!). We invited the knowledge keeper to join the next gathering of the student research group. The knowledge keeper told the students of their own experiences as a student and as an adult dealing with Indigenous and settler peers and with "authorities". The students asked questions and told the knowledge keeper about some of their experiences in and related to school. That interaction reinforced our prediction—people tell different stories depending on

whom they interact with. Dave closed by asking the students if they wanted to be kept in the loop—to be kept informed and to be given the opportunity to guide the future steps with the knowledge they generated and shared in our conversations. They said yes.

Second context: Conversations with new migrant students

The conversations with the Wolastoqiyik students informed our approach to newly migrated students. Again, the first challenge with addressing these students is garnering their interest and trust, but we did not have the benefit of the same kind of teacher ally with longstanding relationships because the students are newcomers. We also know that many newcomers are highly cautious about what they say about their experiences of migration because they are in the process of qualifying for residency status. Many of them come from situations that prompt them to be extremely careful of their information getting into the wrong hands.

Dave and a graduate student met with some classes to tell them about the research and invite participation in interviews. He said that we are interested in interviewing any students but especially interested in the experiences of newcomers. In the first session, he used the approach he had used with the Wolastoqiyik students—asking for examples of things that happen in math class, and following up with questions about what is really happening when these things happen—but the students seemed bewildered by this. The dynamics of being in a larger group of people and also some linguistic barriers probably impacted their ability to focus on questions that are unlike the questions they are accustomed to in school. For the subsequent groups, Dave switched to an approach informed by the interviews with the individual Wolastoqiyik students.

Dave said he would read some statements, and ask students to say if the statement is true, and then to say if they think others think the statement is true. He said that the interviews would go like this, but in the interviews the interviewer would also ask for examples of things that happen because of people thinking the given statement is true. He said that the interviewer would then go vice versa, and ask for accounts of things the students particularly liked or disliked in math learning. With the story of the liked or disliked thing, the student with the help of the interviewer would try to figure out what statements (storylines) people believed in order to get them to do the thing they were doing in that situation.

For this set of storylines, Dave mixed together some storylines from the Wolastoqiyik students and from the research contexts in the sister project described above. So, Dave would say, for example, “When I do math, I need to use my first language” (i.e., a version of a storyline from the sister project) and ask students to put up their hands if they thought it was true (fewer than half of the students said it was true). And then to put up their hands if they thought some people think it is true (almost all the students thought that some people think it is true). The students were laser focused on these questions, locking eyes with Dave in a way he has not experienced in a classroom before. The struggle to decide whether to put their hands up or not was evident on students’ faces (even students who have been in Canada less than a month). In other words, the students were invested in these storylines. The students recognized importance of these storylines—the impact of these storylines on their experience of mathematics learning.

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