COMMON SENSE, NECESSITY, AND INTENTION IN ETHNOMATHEMATICS

David Wagner
University of New Brunswick
dwagner@unb.ca

Lisa Lunney
University of New Brunswick
lisa.lunney@ns.sympatico.ca

In ethnomathematical conversations with Aboriginal elders in Eastern Canada, we examine conflicts in values and intentions between the cultural mathematical practices in Aboriginal communities (both traditional and modern) and Western-oriented schools. Elders' accounts of their mathematical practices highlight common sense, which cannot be applied in a school setting abstracted from community issues and needs.

"You just take a [piece of birch] bark and hold it over the circle. Fold it in half and fold it in half again to get the centre." Mi'kmaw elder, Diane Toney, was well-known for the quality of the boxes she made out of porcupine quills. For her, folding a round piece of bark to find the centre of the circle was common sense; it was not mathematics.

As part of a large-scale project investigating mathematics and science learning in informal contexts in Atlantic Canada, we have been interviewing Aboriginal elders to identify some of their everyday practices (both traditional and current) that could be deemed mathematical. This typical approach to ethnomathematics research (c.f. Powell & Frankenstein, 1997) relies on Bishop's (1988) definition of mathematical activity (practices that involves counting, measuring, locating, playing, designing or explaining) and on the assumption that any mathematics is an artefact of a particular culture.

In these ongoing conversations, it is our intent to get beyond the identification of mathematical practices to consider differences in values and intentions as well as the changes Aboriginal children experience when they are encultured in their classroom mathematics. Thus, our focus question is: *What is lost and what is gained in a move from the community's cultural practice to a "Western" mathematical practice?* Our aim is not to deem such moves inappropriate, but rather to raise awareness to their socio-cultural effects. We believe that awareness of both potential losses and possible new opportunities could mitigate the losses to some extent. Also, awareness may encourage young Aboriginal people to engage more with Western mathematics and science because they will have had the opportunity to explore the issues behind the nagging feelings of inappropriacy that accompany such cultural transitions.

Conflicts Between Aboriginal and School Mathematics

In the interviews, the elders have been quick to identify cultural mathematical practices after we suggest the unacceptability of our larger society's tacit definition of mathematics – things done in mathematics classrooms – and outline Bishop's (1988) alternative definition. For example, when Diane Toney (who died May 15, 2006) made quill boxes (which are circular) she knew that "To make a ring, you need to go across the centre of your birch bark [the diameter] three times and allow about the width of your thumb [i.e. π] to make a perfect round." She could also find a circle's centre as described above.

When we asked about conflicts between cultural mathematical practices and school mathematics, elders responded saying that children take things for granted too much: They only flick a switch to get light. Because different groups of elders responded in the same way, we see that taken-for-granted aspects of our modern world must be at the heart of the perceived conflict

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between traditional practices (some of which remain current practices) and the mathematics the elders see children take in school.

In our interpretation of these interviews, we noticed the frequent reference to “common sense” when the elders described how they know what to do in the situations they described as mathematical. How much wood would they haul home for fuel? “Enough.” How did they know how much to bring? “Common sense.” By contrast, we might consider a school mathematics word problem that asks, “Bob’s wood pile for a week of fuel is about 2 x 5 x 3 feet. What would the dimensions of the pile be for two weeks of fuel?” It is easy to imagine a child in school answering 4 x 10 x 6, doubling each dimension. But it is hard to imagine someone who is cutting, hauling and burning the wood making the same error.

The person who needs wood for fuel draws on common sense, which includes a sense of the situation, a sense of the family’s needs and a sense of the work it takes to meet these needs. In such situations, the answer to our mathematical questions can be “enough”. How many potatoes would you cook? “Enough. That way you didn’t waste any.” These kinds of answer may seem unmathematical because we may wonder how much enough is. But a typical mathematical word problem answer, like “9 potatoes are needed for a family of 6,” ignores the reality of variance in potato size. For the answer to the potato question, a gesture showing an imagined volume (roughly spherical) accompanies the elder’s “enough.” Likewise, for the wood-fetching question, the elder marks a height off with his hand as he says “enough.” The natural gesture, which is part of his answer, does not tell us how much wood was needed, but it does show us that he knew how much enough was.

“Enough” implies a sense of what is needed. For this kind of sense, the question needs to be situated in a problem – a real problem. Children who have everything they need at the their fingertips cannot have a sense of necessity. To ground classroom mathematics in such necessity, we, like D’Ambrosio (1998), suggest that class activity begin with an issue faced by the children’s community. With mathematical activity that begins in local issues, students can begin to use their mathematics to exercise their intentions within these issues. This kind of personal (and communal) agency is different from agency that arises in classroom contexts in which the mathematical starting points relate to other people’s concerns.

When Students cannot use Common Sense

When their mathematics is not grounded in their experience, students cannot apply common sense. They need something else. Perhaps this something else is what some educators call spatial sense and number sense. It seems to be expected that children learn to understand space and number before addressing their community’s issues. The Aboriginal elders who we have been interviewing seem to be saying that this is backwards. Mathematics should *begin* with common sense. Brown (1996) asserts that the emphasis should not be “on students re-creating the teacher’s intention but instead […] on students’ production of meaning in respect to their given task” (p. 64). We suggest that students’ production of meaning should rather relate to their tasks as humans, addressing community needs.

In our presentation, we will describe the elders’ responses to our interpretations.

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