

four seasons in one day –

literacies in changing climates

Adult Literacy Conference ■ Melbourne ■ September 10-11, 2004



Creating a Culturally Inclusive Numeracy Classroom

Keiko Yasukawa

**Faculty of Education
University of Technology, Sydney**

What meanings can be placed on the notion of a “culturally inclusive numeracy classroom”? The meanings, I will argue, depends on the cultural assumptions we bring to the question. Some might even argue that the question of cultural inclusion has no relevance in a numeracy classroom. Others might say the complete opposite and say that cultural inclusion is a prerequisite to all good teaching environments.

In this workshop, I will inviting participants to explore a hypothesis that a culturally inclusive environment has an important link with the development of critical numeracy that empowers groups of learners to examine, and perhaps even shift the position they find themselves in society. So what shapes the culture we identify with? Our age, language, class, ethnicity, gender, schooling, and work are some of the factors that shape how we view the world and what we value. How do these factors more specifically shape how we teach and learn in an adult numeracy classroom?

Although some university professors in a university mathematics course might wonder what “culture” has got to do with mathematics or numeracy learning, many of us who are involved in teaching adult numeracy probably would not think of designing a program without giving attention to the cultural composition of our class. In fact much of the literature on adult numeracy education focuses on helping our learners unlearn the damage they experienced in ostensibly culturally neutral mathematics classrooms (see for example, Frankenstein, 1989, Marr & Helme, 19XX, Benn, 1997).

One of the teaching activities I have used as a way of engaging my students in a critical examination of rote learning, and the more general myth that “there is one right way to do things in mathematics” is to ask them in pairs to listen and observe each other’s way of doing subtraction, say $34 - 19$. In most instances, a number of different approaches and language emerge, even in a small group. The “borrow and pay back” method, the “borrow” (but not pay back) method, the reverse addition method, the “trading” method, and so on. Many of my students who learned the “borrow and pay back” method are fascinated to find out that a method that involves borrowing but not paying back works equally well. All this time they have subtracted morally, only to find out that there are groups of people who have been rewarded with the right answers without ever meeting their obligation to pay back what they have borrowed! This activity is an effective way of getting students to questions how they have learned in their school mathematics classroom, usually in a culture of strict discipline, punishment and reward where the authority of the teacher was equated with the authority and universal truth of mathematics. The process of learning mathematics was a process of being inducted into a particular type of classroom culture where certain mathematical knowledge was valued, and others not mentioned. It is a good starting point for student teachers to recognise the culture they oughtn’t to reproduce in their own adult numeracy classrooms. But what if they hadn’t had this cultural experience in school? What if they hadn’t been in a mathematics classroom? When I first started teaching some of our Aboriginal and Torres Strait Islander students in the adult education course, a few of them said exactly that - “but Keiko, we weren’t allowed to stay in the classroom. The teacher told us that black kids didn’t need to learn arithmetic. We were told to go outside and play football.”

Many of my students identify with some of the Peanuts comic strips which shows the characters answering multiple choice tests. I use some of these cartoons as an ice-breaker activity at the beginning of a numeracy course. Again, it would be easy to assume that many people have experienced the dilemma and anxiety associated with multiple choice tests - having to circle the one right answer. Last year, one of my students shared a story about her first experience with a multiple choice test late in her life in a TAFE course. Having never done one before, she interpreted “multiple choice” to mean that she could make multiple choices of answers. So she did, and failed spectacularly.

What other assumptions are we making about our students' experiences and backgrounds when we design what we intend to be an inclusive numeracy activity? Probably many, and with the best of intentions, we cannot hope to be aware of all of them ahead of time. What is important, is to create an environment where students can feel free to share alternate experiences, rather than feel silenced by the assumptions that we, or other students bring. For our own and other students' learning, the assumptions that we uncover in ourselves and others help us to better understand our own culture, and how our culture interacts with others. In a numeracy class, we can learn a little bit about how our mathematics experience (or lack of it) has shaped our view about ourselves and who we aspire to be.

Why is an inclusive classroom culture important, beyond the obvious, of making our learners feel comfortable and engaged? In the Introduction to their book *The Culture of Mathematics Classroom*, Seeger, Voigt and Waschescio (1998) identify as a central question "how 'classroom culture' relates to 'culture at large,' how 'sharing the culture' relates to 'creating culture,' and how sharing a particular culture may relate to sharing culture at large (1998, 1). An adult numeracy classroom provides an opportunity for the learners to share the cultures they bring to the classroom through their numeracy practices.

A Japanese learner might find the various methods of subtraction that is taught in Australian schools curious, because she learnt arithmetic using the abacus, and she still sees small shopkeepers using the abacus to do sums and calculate change, even when they have an automatic teller in the shop. By sharing different methods, and where and how they have experienced these methods, other learners get a glimpse of other cultures. The Indigenous students who might have missed out on school mathematics will share methods that they have developed themselves, or learnt from others. Where they learnt the methods, and in what context they have learnt it, help to reveal the diversity of numeracy practices that are operating in the wider social world, even though many of these are absent and invisible in the school mathematics classroom.

Inviting students to share their different methods can help to expand their mathematical understanding. For example, unpacking the "borrow and pay back" method will reveal that the difference of two quantities remains the same if you added the same amount to each of the quantities. The "borrow" (without paying back) method can help to make a clearer connection between the way subtraction is done on paper and the decimal place value system. Watching how some people calculate change by "adding back" shows the relationship between addition and subtraction.

At another level, sharing different approaches can also lead to critically examining the values attached to different types of knowledge. Adult numeracy education is not about redoing school mathematics. If it didn't work for someone the first time, what are the chances that it will work the second time, especially if the first time was particularly traumatic for the learner. There is another reason for not repeating the school mathematics experience. Giving visibility to different numeracy practices, including schooled numeracy practices provides an opportunity for the learners to think about why school mathematics was not inclusive of these "other" practices. Whose interest is served by privileging certain mathematical knowledge over others? More importantly can our learners' interests be served by affirming the collective and diverse numeracy practices and knowledge of the group?

In the workshop, I will invite participants to consider 3 questions:

- How does a culturally inclusive numeracy classroom help individuals learn numeracy?
- How do teachers bring questions of culture into the numeracy classroom?

- How can an affirmation of diverse numeracy practices and knowledge in the classroom be used to create a culture in the broader sense that would increase the social empowerment of the learner group?

Bibliography

Benn, Roseanne, 1997, *Adults Count Too*, NIACE, Leicester, UK.

Frankenstein, Marilyn, 1989, *Relearning Mathematics: A Different Third R – Radical Maths*, Free Association Books, London.

Nelson, David, et al, 1993, *Multicultural Mathematics: Teaching Mathematics from a Global Perspective*, Oxford University Press, Oxford.

Seeger, Falk, et al (eds), 1998, *The Culture of the Mathematics Classroom*, Cambridge University Press, Cambridge.