

Reshaping mathematics' army of conscripted billions: a reaction to Paola Valero's "Cutting the calculations..."

David Wagner, University of New Brunswick

The plenary panel at PME 2014 comprised four responses to a new school development scenario proposed by moderator Mamokgethi Setati Phakeng. The responses – by me, Anjum Halai, Paola Valero, and Margaret Walshaw, in that order – were each followed by a reaction from one of the other panelists. I was assigned to react to Valero. A description of the initiating scenario and the structure of the panel discussion can be found in the proceedings, written by Phakeng (2014). This is followed in the proceedings by our four responses. Our reactions to each other are not in the proceedings. We developed them after our meeting together two days before the panel. Here is my reaction to Valero (though not word for word). She entitled her response to the scenario: "Cutting the calculations of social change with school mathematics" (Valero, 2014).

I want to build on Paola's powerful response to the school proposal. In particular, I'll focus on "the issue of who the students will become" (Valero, p. 74) and the promise of empowerment (or redemption) that motivates the proposed school.

I will present to you an example of someone who has been shaped by the powerful influence of school mathematics. Me. And there are other examples here, including Paola, and, actually, everyone here. We have all been shaped by school mathematics. Let me reflect on my experience of being shaped in this way and on being part of the system that shapes others. I invite you all to reflect like this too.

It has been hard to transform myself and resist the force of school mathematics. Its particular approaches to truth and values have been stamped into me by years of meaningless repetitive procedures. This has shaped my way of thinking about important questions, including:

- What is truth?
- What is success?
- What is convincing?
- What genders and cultures are privileged?

When thinking about the way I have been shaped by the school mathematics practices that I experienced as a student for more than a decade, and as a school mathematics teacher for almost a decade, I wonder if my privilege makes it harder or easier to resist this powerful shaping force. As noted in my response to Dr. Dlamini, I am a creature of privilege – white, male, etc. (Wagner, 2014). As is the case for any child in school, the children in Dr. Dlamini's school will have to reconcile the culture promoted in the school with their home cultures. This is a challenge.

In many ways, my privileged culture aligns with the school mathematics values. Indeed, these values have been shaped by people with privilege and thus their cultures. By contrast, children from underprivileged cultures may be less likely to opt in to the kind of “success” mathematics demands, at least as it appears to demand when mediated through schools. While school mathematics would have appeared more natural to me as a child due to my privileged culture, it was also easier to resist the force because I had and still have the resources to succeed in other ways. In short, it was easier for me to opt in and easier to opt out. That’s the way it is with privilege – easier.

I opted in. I do not regret that choice but now ask critical questions about the culture I have allowed to shape what I consider valuable, what I consider convincing, and what I consider relevant. A question that comes from these values is often asked of mathematics education work relating to equity. Probably some of you here are asking this question now, during Paola’s message about theory and during all our responses to Dr. Dlamini.

Where is the mathematics?

I want to address that question now. Let’s warm up with some obvious math.

What is the product of 3 and 7?

Yes. It is 21. Okay, now for the real question, which is not so obvious...

What is the product of mathematics?

It is me, Paola, all of you...

It is an army of billions trampling this earth. Yes, this army does some good things, but it also does some terrible things. When I say this, I am thinking of D’Ambrosio’s (e.g. 1994) promotion of reflection on the good and bad of mathematics.

The army is seductive. It is easy to think of the army as good. Most often we think of mathematics as abstract and free of moral questions (but I note that such unquestioned forces are the most dangerous). If we do think about its moral force it is easy to think about the good things it does because that is what we have been told often in mathematics classrooms. This is like conventional armies, which do things we think of as good – for example, protecting people (or should I say ‘protecting a certain social order’?).

What are the options available to us within this army? We could aim to rise in the ranks without questioning its culture. We could try to desert, and abandon association and participation with mathematics. Or, we could stay within the army and try to change the culture. I think most of us are doing this – trying to change the culture from within – but our approaches to this vary and the extent we aim to change the culture varies.

How do we change the culture of the army? How do we change the culture of school mathematics? First, we can remind others in the army that they are more than soldiers;

they do not have to follow blindly. We remind them that it is their responsibility to question and critique, even while participating in the culture. Second, we can consider the good things we ourselves have done with mathematics. For me, I think of ways I have used mathematics to help me speak truth to power; I have raised significant questions in response to claims made by political leaders in my country. I have also used mathematics to help me develop systems of fair distribution. Third, we can support others in developing such skills, all the while reflecting on the ethics. This is what I want for the students in Dr. Dlamini's school and for students in all schools. I want them to use mathematics as a tool for what they consider to be good, and to reflect on their ethics and also the ethics behind others' use of mathematics.

References

- D'Ambrosio, U. (1994). Cultural framing of mathematics teaching and learning. In R. Biehler, R. Scholz, R. Sträßler & B. Winkelmann (Eds.) *Didactics of mathematics as a scientific discipline* (pp. 443-455). Dordrecht: Kluwer.
- Phakeng, M. Setati (2014). The calculus of social change – mathematics at the cutting edge. In Liljedahl, P., Nicol, C., Oesterle, S., & Allan, D. (Eds.) *Proceedings of the Joint Meeting of PME 38 and PME-NA 36*, Vol. 1, pp. 55-60. Vancouver, Canada: PME.
- Valero, P. (2014). Cutting the calculations of social change with school mathematics. In Liljedahl, P., Nicol, C., Oesterle, S., & Allan, D. (Eds.) *Proceedings of the Joint Meeting of PME 38 and PME-NA 36*, Vol. 1, pp. 73-77. Vancouver, Canada: PME.
- Wagner, D. (2014). Privileging local cultures and demographics in the mathematics classroom. In Liljedahl, P., Nicol, C., Oesterle, S., & Allan, D. (Eds.) *Proceedings of the Joint Meeting of PME 38 and PME-NA 36*, Vol. 1, pp. 61-66. Vancouver, Canada: PME.