

## **Ethical practice in mathematics education research: Getting the description right and making it count**

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*Abstract Building on the work on ethics in educational research in recent publications, we present a framework for ethical practice in mathematics education research. In particular, we discuss what are the implications of claiming or denying a particular piece of research as acceptable within the community. We argue that researchers must be aware for whom they advocate, thus making it count. We present a map with which researchers should engage the ethics of their practice, and we suggest that they must consider whether they are getting the description right.*

Howe and Moses (1999) have presented a detailed history of ethical practice in educational research, and Sowder (1998) has done much the same in a collection on mathematics education research. In the latter, Sowder also discussed issues of ethics in the dissemination of research findings. Together with these authors we wish to recognise: that educational research is always advocacy research inasmuch as unavoidably it advances some moral-political (and so ideological) perspective; that educational researchers must be able to defend what their research is for (respect for truth); that the research must have points of contact with insiders' perspectives (voice, respect for persons); and that it militates against race, gender, class and other biases (respect for democracy) (Bassey, 1999, p. 37).

Summarising these overviews, we propose that researchers should engage with the following questions:

- On whose behalf is the research advocating? Is it against racism, sexism, classism etc?
- What is the research for? Can the researcher defend the research? On what grounds?
- Does the research incorporate the insider's perspective?
- Is the research reflexive?
- Does the research take care of those being researched, especially avoiding their oppression?
- Does the research draw on refined notions of consent, autonomy, and privacy?

Our concern in this paper is to extend these ethical positions and to ask: On what grounds can one claim that a piece of research is or is not *mathematics education research*?

Sowder (1998) began her chapter with some scenarios. We will do the same here and through them we will present the main themes of our argument. The first is a fictitious scenario but familiar to many of us in the issues it raises. The second scenario is a perspective on TIMSS. We conclude with presenting a map for

researchers to elaborate an ethical framework for their research and applying that map to the two scenarios (for a more developed account see Adler & Lerman, in press).

### **Scenario 1 (fictitious) - A research dilemma**

All over the world there is a tendency towards reform in mathematics teaching and learning which takes for granted the four following features:

- Rich mathematical tasks
- Relating mathematics to real life experiences and practices
- Learner-centred practice (valuing and working with learners' mathematical meanings)
- Inquiry-based classrooms.

These reform initiatives are being researched and developed and, while emerging from practices in the developed world, they are nevertheless the object of desire in the developing world, despite substantive contextual differences. The underlying assumptions in the reform, and in much of its related research, is that these four features of mathematical classroom practice will lead to appropriate, meaningful and more successful mathematical learning.

Imagine a situation where the dominant forms of schooling are over-determined by selection rather than education. In poor countries there are enormous constraints on wide provision of public services (like health care) and public goods (like education). As Mwakapenda (2000) so vividly describes of Malawi, when only 10% of primary school leavers gain access to public secondary schooling, teaching and learning practices are inevitably driven by the forces of selection. Processes of democratisation and development – increasing equitable access to improved social and economic goods – in such a context are significantly different from those in the developed and dominant world. It goes without saying that mathematics education reforms will be shaped by such divergent conditions.

Imagine a mathematics education researcher from a developing context as described above, at the level of, say, PhD. As is often the case, this person gains entry into PhD study in an institution in the developed world, and is sponsored by the State Department of Education in his country. He enters a world where what counts as a problem in mathematics education is framed by the reform movement described above. He decides, after considerable exploration of the field, to study the implementation of inquiry-based mathematics teaching. He believes, as a result of his reading, discussion, and reflection on the educational situation at home, that inquiry-based approaches offer potential for improving mathematics teaching and learning in his country. He communicates with relevant parties at home, teachers are reported to be interested. He develops a programme and a set of materials that he believes are appropriate to his home context and he returns to set up the project, including at this stage, a series of workshops with a selection of Grade 7 mathematics teachers (the final year of primary school). During this time, he obtains their agreement and support for the project. Indeed, the teachers appear to enjoy the workshops where inquiry-based mathematics learning is modelled and issues discussed. The teachers share with him how they have been challenged

mathematically and pedagogically. They express positive views of the potential for such practice in their own classrooms and a willingness to implement these ideas. He then spends a short period of time with one of the teachers in her class and together they try out activities in her classroom. On the basis of this piloting, he modifies and then leaves a set of materials for all the teachers to try out and develop and reflect on in their respective Grade 7 classes and returns to his academic institution.

Armed now with what has been agreed by his institution as sufficient ground-work and piloting, he proceeds with designing the next and critical phase of the research, the collection of data related to teachers' implementation, and so interpretation, of inquiry-based mathematics learning. Three months later, as planned, he returns home, this time with a range of research tools (instruments) and a carefully formulated participant observation design process for data collection and analysis. To his dismay and frustration he finds, across all the teachers, that the materials have barely been touched – an occasional activity had been tried. Moreover, term dates have been unexpectedly changed. Instead of a process being underway where he could now work with teachers to interrogate their interpretations of inquiry-based mathematics teaching, the teachers are focussed on preparing their learners for the kinds of assessments they will face at the end of their primary schooling. Teaching is restricted to providing practise with algorithms for the operations on common and decimal fractions. What is more, the extended time he had thought would be available for participant observation has been curtailed by changed examination times. He now faces considerable practical, methodological and ethical challenges.

He could continue with a modified exploration of inquiry-based mathematics. He could, for example, organise additional time with learners and teachers from one or two schools, after school hours, where he himself teaches mathematics in an inquiry-based way. Through this research strategy he might be able to identify and describe the kinds of activities learners engaged with, how and with what effects. His overall description and explanation is, nevertheless, likely to proceed from a starting point of 'failure' in relation to mathematics education reform by the educational system in his country and include a description of how and why the teachers were unable to implement inquiry-based mathematical learning. The description would keep intact a decontextualised sense of the potential benefits of inquiry-based mathematics teaching, and lead to recommendations for how school mathematics needs to change in his country, and what is needed to support this change.

By contrast, he could abandon his orientation to inquiry-based mathematical learning and reorient the study so as to understand why and how testing has come to over-determine considerations of epistemology and pedagogy, and how and why the timetable changed, so 'disrupting the data' (Valero & Vithal, 1998). This would be a difficult decision to take. Given time constraints for the study, he would need to proceed with a rolling plan for interviews, observations, where time for developing and piloting instruments was curtailed. If he travels this road he is likely to elicit data related to the selective function of mathematical performance,

and to a range of socio-cultural and political conditions that shape the forms of school mathematics practice in Grade 7 in his country. His description and explanation of what happened through his research activity is more likely to focus on wider educational issues than strictly mathematical ones. He is also likely to be able to explain resistances in the system (as opposed to resistances in the individual teachers) to the intended 'reforms'. In other words, to explore and understand what happened would require redesigning the study, and most critically, zooming out of inquiry-based mathematics and into the wider educational practices in which the teachers are positioned.

How should he proceed? Which route should he follow? Depending on where he shares his quandary, he is likely to experience quite diverse and unsettling responses, particularly if he presents a preference for the latter approach. In the wider educational arena he could be challenged as to his competence to take this more sociological and systemic approach to the research. He is likely to share this concern. At the same time, in the community of mathematics education research, he is likely to experience reactions like: "Well, this is no longer mathematics education research" (one of us was witness to precisely this negative reaction when a similar situation was raised for discussion at an international mathematics education research forum).

What we are raising here is that getting the description right and making it count across diverse interests are ethical issues that need to inform the practices of the mathematics education research community.

Let's assume that because of this ethical standpoint, and within his financial and time constraints, the researcher proceeds along the more challenging path. He makes this choice despite not being an apprenticed sociologist and aware that it might well undermine goals for his own development and entry into the community of mathematics education research. He sets out to explore and explain teachers' practices in their mathematics classrooms with tools from the interpretative turn, and so to chart a less clear methodological path. As intimated above, he finds his description of teaching practices are framed by an analysis of the educational system in his country, fiscal constraint, and its overall examination and selection processes. The knowledge produced becomes more about how the teachers interpret and explain their mathematical practice within such systemic enablements and constraints, rather than about teachers' understandings of, and approaches to, inquiry-based mathematics. He goes on to include recommendations for a serious localisation of the notion of "inquiry-based" mathematics, and a speculation that a description of its forms and functions is likely to be substantively different from that which permeates dominant mathematics education discussion.

From our concerns with ethics in this chapter, this emergent description is 'right'. But our experience is that it does not easily count in the dominant field of mathematics education research. There is always the additional question: Is this research *mathematics* education research? From a research perspective this can be re-interpreted as: Can and will it add to the knowledge base in mathematics education?

Some, including ourselves, would answer in the affirmative. Despite limitations that are inevitable given time and financial constraints, this research could and should inform the knowledge base in mathematics education. The position here is that insights into the challenges of reforming the teaching and learning of mathematics in school lie precisely in an understanding of how mathematics takes shape in teaching and learning situations across school contexts. Such insights entail more than a grasp of the mathematics of the reforms intended, and their interpretation. Critically, getting the description ‘right’, and making it count for its participants, entails coming to grips not only with didactical transposition (Brousseau, 1989) but with recontextualisation processes inevitable in schooling. Curriculum change involves changes in how knowledge is classified and framed, and so too in relations of power and social control (Bernstein, 1996). Curriculum change will inevitably be contested terrain. It thus requires an in-depth understanding of school mathematics, and schooling itself, across diverse contexts.

This story and the questions it provokes are about the worth of the research reported, its quality, its boundaries and its methods, its financial constraints, and ultimately about ethics and values. We will return to this scenario in our concluding remarks.

## **Scenario 2 - TIMSS**

This second description will be brief for reasons of space. In a globalising world, international comparative assessments make sense. They provide benchmarks for both internal and external comparisons. Such arguments have been made both by the key organisational hub for TIMSS (Plomp, 1998) as well as wider afield (Nebres, 1999). As it re-entered the world in 1994, participating in TIMSS in 1995 was an attractive option for South Africa. Here was a possibility for setting up a benchmark against which progress by the post-apartheid Government could be mapped and judged (Howie, 1998). The results of TIMSS are now well known, and need no rehearsal here. The question we pose is the broader ethical one that drives this paper. Did TIMSS get the description right? Keitel and Kilpatrick (1999) pointed to four problems: that the direction of the study has been over-determined by psychometric expertise; that financial support for the study influences the goals; that control over the framing and dissemination of results necessarily affects the results; and that there is an assumption that curricula across widely diverse contexts can be compared through learner performance presented as an average.

We wish to raise some questions, following their critique, and reflecting our concern with getting the description right and making it count:

- why were countries ranked as in a league table?
  - whose interests are served by this?
  - what kind of description is this?
- on whose behalf is TIMSS advocating?
- Given that the results served conservative agendas in so many countries, and that researchers are thought not to be responsible for how their work is used, where does responsibility begin and end in mathematics education research?

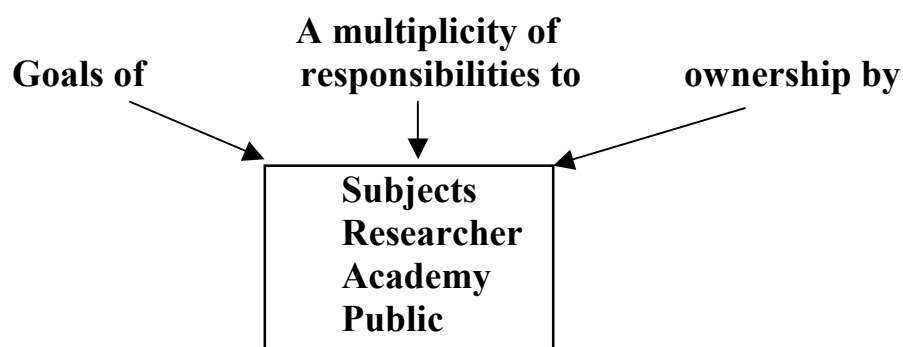
These criticisms of TIMSS are known. Why are we repeating them? Our point is that in the light of the above criticisms, TIMSS cannot get all of the description right, and in its omissions lie significant ethical issues, and thus for whom does this research count?

### **Concluding remarks**

There has been a distinct Southern African focus in this paper. We are aware of the danger that some readers might marginalise the ethical issues we have raised because the history of the region, indeed the continent, is full of very dramatic inequalities, exploitation by the 'developed' world, and so on. We insist, though, that whilst inequalities might be more stark in Southern Africa than in many other places, inequalities and injustices are just as pervasive and ubiquitous in every part of the world and within every society, if sometimes less obvious. The cultural capital of success in school mathematics is common across the world: so too is the failure of so many students from working class and disadvantaged groups in mathematics. It is precisely the high levels of inequality that throw ethical issues into relief, issues that need to be confronted by all mathematics education researchers wherever they are.

We consider that educational research should be seen as located in a knowledge-producing community (Usher, 1996). What comes to the fore is the engagement with others and with history in an enterprise that should meet, as well as perhaps challenge, sets of socially constituted standards and values. Research communities, like all communities, are fragmented, with sub-groups, established and new paradigms, tensions, disputes, and boundary conflicts. These are indications of a normal healthy research community: the modernist image of a unified scientific group achieving universally accepted answers to universally agreed research questions is no longer expected. The complexity of the research enterprise is thus captured in the notion that it is a social practice.

Research can then be seen as a map:



Research must take account of this multiplicity. Thus, in our **first scenario**, our researcher's dilemmas concern:

Goals: to modify his study of inquiry-based mathematical learning, or to examine why testing overcame other issues. He needs to be aware of the goals: of his subjects, the teachers, to be supported in their struggles, not undermined, and not to have their trust broken; of the academy, to do what informs *mathematics education* research in ways that uphold if not develop the ethical standards of the community;

and of the public, who want the best for their children, whatever that may mean, and who want their privacy respected.

Responsibilities: to his subjects, the teachers, to advocate for them, not to hold them up for criticism when they joined him in his plans in good faith, as his understanding of their situation changed; to himself, in gaining a PhD within the community to which he belongs and at the same time to be true to what matters to him in his research; to the academy, to advance knowledge of the teaching and learning of mathematics in its widest sense whilst challenging the community to recognise and value the research issue; to the public, to do research that takes care of teachers and students whilst informing for future policy.

Ownership: by the subjects, who see themselves to some degree as participants in the research, to improve the learning of their students, but pulled also by many other, perhaps stronger, constraints; by the researcher, who demands that his community also claim ownership through him; by the academy, that this *matters* to mathematics education research; by the public, that they should share in researching their schools.

In our **second scenario** of international comparisons, perhaps a question mark should be raised over the whole enterprise. If it does proceed to a FIMSS then the researchers' dilemmas concern:

Goals: of the subjects for the improvement of their life chances and therefore for the international publication of balanced, moderated results; of the researchers to endeavour to take account of all the factors that impinge on the results; to the academy to represent the subjects fairly so that the results are valid; and to the public not to misrepresent and do harm to their communities, including the educational community.

Responsibilities: to the subjects, to advocate for them; to the researchers themselves to produce democratically valid, generative results; to the academy to take responsibility for how their research might be used; to the public to represent appropriately the subjects of the research so as not to mislead and perhaps inadvertently encourage negative stereotypes.

Ownership: by the subjects, that they are included in the research at least by appropriate representation; by the researchers, again to worry about how their research will be used and by whom; by the academy to ensure that such research is for the researched as well as for the research community; and by the public so that the large sums of money spent will be of value to them in improving the life chances of their children and their community.

The community is very successful in locating and engaging with issues and challenges where the mathematics is prominent. We are convinced that the community also needs to be more open to seeking questions and answers where the mathematics recedes behind a myriad of intersecting social and political issues. Let us be clear: social and political issues are not an irritation that gets in the way of research in mathematics education. We consider it our ethical responsibility to seek

out these settings for research. Otherwise we collude in denying access to power and control over their lives for the majority of students.

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