Mathematics Education Research Journal 1997, Vol. 9, No. 1, 1–4

Editorial

Problematising Mathematics Education Research

Nerida F. Ellerton

In his introduction to the *International Handbook on Mathematics Education,* Bishop (1996) commented that the 36 chapters of the *Handbook* provide "glimpses into the future in many important aspects of mathematics education," and collectively, "constitute a blueprint for mathematics education in the 21st century" (p. 4). I have a similar conviction about the articles published in the *Mathematics Education Research Journal.*

Although the word "conviction" may sound emotional, and perhaps even extreme in this context, unless articles published in MERJ, and other similar international mathematics education research outlets, are thought of as sources from which new directions for the future can be conjectured, then mathematics educators are in danger of looking back complacently at their past achievements, of not reflecting sufficiently on past impediments, and of not using the results of research to achieve improvement. In other words, we need to be forward looking, consciously seeking to learn from the past while at the same time grasping the nettle of future possibilities invited by the results and directions of research.

At present there is no shortage of published reports of quality mathematics education investigations, and of high-quality syntheses of research findings (see, for example, the reviews in Grouws, 1992). But what is the purpose of such publications if they do not inspire reflection and action which enables many more learners, around the world, to learn mathematics well?

Reflection, I believe, should be a key to the planning, conduct, and interpretation of all mathematics education research. But to talk solely of reflection about data gathered, or about the mode of analysis, or about the methodology adopted, would be to trivialise the whole process of reflection. For unless we are able to stand back from our immediate small worlds of research—including the pressure to produce research output—and reflect on and problematise the criteria for proposing and evaluating mathematics education research, then it is almost impossible to look forward in the true sense of the word.

Taking the Past for Granted

The very things we take for granted are often the things which we need to problematise. As Papert (1980) noted, change to the transport system of one hundred years ago did not come about because of refinements to the wheels used on horse-drawn carriages; rather, change came by way of those who dared to propose fundamental advances in the *purposes* of vehicles. Once a wider view was taken, new designs and methods of construction, were seen to be needed.

If the 21st century is to be a century in which the "Mathematics for All" ideal is to be realised, then it is likely that the purpose(s) of mathematics education, and of

mathematics education research, will be placed under the microscope. Mathematics education should enable all learners, everywhere, to be "better" people—"better" in the sense that they will be better prepared to survive with dignity and have a greater degree of control over their own lives. That cannot be achieved unless the traditional unquestioning acceptance of (indeed, unwillingness to scrutinise) historically elitist mathematics curricula, and the tendency to repackage and market these old curricula as if the "new" forms represented exciting innovations, become matters of concern for all mathematics education researchers.

Similarly, mathematics education researchers who have proclaimed the need to use a range of different forms of assessment, and have been critical of the over-use of the ubiquitous pencil-and-paper test, should be asking whether it is legitimate to continue to use pencil-and-paper tests as stand-alone instruments for measuring key variables in their own research.

Ten Problématiques for Mathematics Education Research

In our recent book, *Mathematics Education Research: Past, Present and Future*, Ken Clements and I put forward ten propositions in an attempt to open up discussion about the way forward for mathematics education research (Clements & Ellerton, 1996). In doing so, we emphasised the need for mathematics educators: (a) to examine fundamental assertions which currently drive research activities in mathematics education; (b) to give due accord to how linguistic and cultural factors influence mathematics education; (c) to question whether it is helpful or even reasonable to work towards the development of "grand theories," on the assumption that mathematics education is progressing towards becoming a science; and (d) to demonstrate a greater respect for the wisdom of practice deriving from the classroom knowledge and the action-oriented theories of practising teachers of mathematics. (p. 190)

The ten propositions are reproduced below—the page numbers given after each proposition indicating the page from Clements and Ellerton (1996) on which that proposition is stated:

1. Identifying the Bases of Current Practices in School Mathematics

   > Many outdated assumptions influence the way school mathematics is currently practiced. The identification of those assumptions which most urgently need to be questioned represents the first, and perhaps most important, problématique of contemporary mathematics education research. (p. 173)

2. Doing More Than Prepare Students for the Next Highest Level of Mathematics

   > Those concerned with mathematics education need to develop ways of investigating claims that: (a) mathematical knowledge, skills, relationships and principles are characteristically hierarchical; and (b) the main concern of school mathematics is preparation for higher level mathematics courses. (p. 176)

3. Making Language Factors a Central Concern

   > The implications for mathematics education of the fact that many mathematics learners are bilingual or even multilingual urgently need to be explored. (p. 177)

4. Rejecting Cultural Imperialism in Mathematics Education Policies and Practice

> The assumption that it is reasonable to accept a form of mathematics education which results in a large proportion of school children learning to feel incompetent and helpless so far as "Western" Mathematics is concerned, should be rejected. Alternative forms of mathematics education, by which greater value would be accorded to the cultural and linguistic backgrounds of learners, should be explored. (p. 178)

5. Working Out the Implications of Situated Cognition Research Findings for Mathematics Education

> The implications of situated cognition research for mathematics curricula, and for the teaching and learning of school mathematics, needs to be investigated in creative ways. (p. 180)

6. Reconceptualising the Role of Theory in Mathematics Education Research

> The idea that the best mathematics education research is that which is based on a coherent theoretical framework should be subjected to careful scrutiny. Furthermore, popular existing theories for which strong counter data have been reported, should either be abandoned immediately, or substantially modified. (p. 183)

7. Developing a New Epistemological Framework for Mathematics Education Research

> A suitable framework for achieving a more unified and systematic approach to mathematics education research is needed. One possible approach would focus on research programs which linked (a) the histories of mathematics and mathematics education; (b) mathematical understandings and achievements in different cultures; (c) the influences of culture on young (pre-school) children's conceptions of mathematics; and (d) the impact of schooling on learners' conceptions of mathematics. (p. 185)

8. Questioning the Basis for Assessing Achievement in Mathematics

> Closer research scrutiny needs to be given to the issue of how achievement is best measured in mathematics, and pressure should be exerted on education systems, testing authorities, mathematics competition directors and, indeed, mathematics education researchers themselves, to apply the findings of such research. (p. 186)

9. Establishing Research Communities Which Value All Participants

> Practising teachers need to be involved, as equal partners, in mathematics education research projects, and the theoretical assumptions and practical approaches in such projects should not be predetermined by outside "experts." (p. 188)

10. Making the International Mathematics Education Research Community Truly International

> The present international mathematics education research community needs to move proactively so that full and equal participation is possible for mathematics educators in countries which are currently under-represented in the community. (p. 188)

To the Future

If the international mathematics education research community allows itself to be pressured to continue to revisit past curricula, to refine, to the nth degree past assessment procedures (using "t-model Ford" education measurement approaches), and to continue to use tired research methodologies, it will put on the mask of complacency and self-sufficiency, and be likely merely to re-invent the wheel. In such a case, there is much cause for pessimism. By contrast, if the community is courageous enough to reconsider, reflect, deconstruct, and reconstruct, then there is cause for optimism.

When, at the end of the twenty-first century, educators look back on mathematics education research at the end of the twentieth century, they will wonder at the origins and persistence of practices and theoretical dispositions in vogue at the time. This editorial invites mathematics education researchers around the world to develop and adopt visions which take them into new territory. Perhaps some will be able to change the course of history.

References

Bishop, A. J. (1996). Introduction. In A. J. Bishop, K. Clements, C. Keitel, J. Kilpatrick, & C. Laborde (Eds.), *International handbook on mathematics education research* (pp. 1–4). Dordrecht: Kluwer Academic Publishers.

Clements, M. A., & Ellerton, N. F. (1996). *Mathematics education research: Past, present and future.* Bangkok: UNESCO.

Grouws, D. (Ed.). (1992). *Handbook of research on mathematics teaching and learning.* New York: Macmillan.

Papert, S. (1980). *Mindstorms: Children, computers and powerful ideas.* New York: Basic Books.