Editorial

IMPROVING MATH CLASS THROUGH ACTION RESEARCH

Kurt W. Clausen, Editor

In the past, using action research to aid the teaching process has not been a popular pastime among the mathematics community. Bill Atweh, a long-time promoter of this new paradigm in the field of math education, noted in a 2004 survey that fewer than 50 articles had been published on this subject in the 10 years up to that point. I may add that, in a quick Education Resource Information Center (ERIC) search, a meager 7 articles have apparently been brought out since then (they have been listed below the reference section).

To what can this reluctance be attributed? Many would say that it is due to a particular mathematical frame of mind. Frequently associated with professional development and group dynamics, action research may be seen by this faction as lagging behind in the area of "rigorous" examination. As well, because a good deal of the conclusions in action research stress the centrality of "contextualized knowledge", there seems to be an implicit consensus that they have little use due to a lack of generalizability, validity and reliability. Finally, there is a perception, and not limited to the math community, that action research is more the realm of the practitioner than someone who deals with numbers. All these "not quite" spoken comments do much to alienate the more scientifically-inclined researcher from indulging in such form of study.

While these disparaging sentiments have come from all fields of education in the past, it has been the mathematics-related domains that have had the most difficulty in embracing a more constructivist mindset in recent years. Objectivity, rigour, quantitative analysis: these have traditionally been the pillars of experimental designs employed for seeking the truth in math.

A glacier-like movement has been occurring in the math world, however, in favour of a more constructed-approach to research: This has come from a number of fronts. The first stems from a series of studies and treatises that assess the predominant teaching methods employed in math classes, and found them wanting. Specifically, proponents of reform have disputed the use of "transmission" instruction, arguing that it has been largely unsuccessful in promoting conceptual understanding and application of math to real-life contexts. Instead, findings suggest that while this form of teaching may develop some low-level rote procedural skills, it will not aid in attaining the higher reasoning, problem solving, and communication skills that students will need to be competitive (Silver & Stein, 1996). Even more critical, Battista (1999) avows that "for most students, school mathematics is an endless sequence of memorizing and forgetting facts and procedures that make little sense to them" (p. 426). A major conclusion that this research has arrived at is that teachers should get students more actively involved in the learning process. A primary way of doing this, these studies argue, is by having classroom teachers performing their own research on the pros and cons of new educational methods.

A second source comes not from primary studies, but from a secondary source. While action research in mathematics has only appeared infrequently in high-level peer-reviewed academic journals, researchers have been admonished to do so from prominent leaders in the math community. This has been done through such organizations as the National Council of Teachers of Mathematics (NCTM) and the National Research Council (NRC) (see, for example, NCTM, 1989, 1990, 2000; Steen & NRC, 1990). As well, several international handbooks have devoted space to describe the benefits and procedures of these qualitative research methodologies. In his recent work on the subject described above, Atweh (2004) points out the small but important references found on the subject: For example, reflective practice is mentioned throughout the *Handbook for Research on Mathematics Teaching and Learning* (Grouws, 1992). As well, readers are directed to the specific chapters on action research found in the *International Handbook of Mathematics Education* (Bishop, Clements, Keitel, Kilpatrick & Laborde, 1996) and the *Research and Supervision in Mathematics and Science*

Education (Malone, Atweh & Northfield, 1998). Finally, ten chapters are devoted to the findings of classroom experiments in *Research Design in Mathematics and Science Education* (Kelly & Lesh, 2000). Quite obviously, there has become a general trend (in this area) towards "practice-based" methods of research in the field.

Beyond criticisms of the traditional method or requests to "give action research a chance", many new university based-researchers have struck out on their own inquiries. The difference here is that, for these people, action research has become just another arrow in the investigator's quiver. In other words, they haven't done these studies to prove a philosophical or political point. Rather, they chose this methodology because they just naturally flowed from the questions they were asking. The three studies in this issue exemplify this spirit of research. First, **Kate Mahoney** (a university instructor) and **Todd Fagerstrom** (a grade-one teacher) examine how strategic use of recess-scheduling can aid in student behaviour in math class. **Shawn Bullock** then straddles the line of the university and secondary-school level as he examines the integration of writing into a college physics classroom as an aid to concept-building. Finally, the pre-service educator **Melanie Tait** takes a look back at her own teaching practices by surveying 10 of her alumni on anxiety and strategies as they begin their new careers as math teachers.

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