Living in the Gap: A Tale of Two Different Types of Researchers

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The issue of the research-practice gap — the discrepancy between what we know about teaching and learning mathematics and what actually happens in mathematics classrooms — has been recognised as problematic for at least the past two decades. This paper documents a discussion between two researchers, one a teacher and the other a university academic, who have developed a successful professional relationship that has proved to be a productive collaboration both in terms of implementing ideas in the classroom and in terms of the publication and presentation of these ideas. This discussion considers the reason for the success of their partnership as well the implications for this success in narrowing the "gap".

Since 1994 we have worked together as a teacher (Vince) and a researcher (Merrilyn) who share an interest in secondary school students' mathematical thinking. Merrilyn conducted most of her PhD research as a participant observer in Vince's Grade 11 and 12 mathematics classrooms. Since then we have continued to collaborate on other projects, and Vince has enrolled in a PhD with Merrilyn as one of his advisors. During this time Vince also took an active and high profile role in professional associations, culminating with his election as President of the Australian Association of Mathematics Teachers. Recently, however, he embarked on a career change, leaving his job as a school teacher to take up a tenurable position as a university academic. We thought it was important to document our reflections on what has been a relatively rare working relationship, at this time, because of the inevitable change that must follow from Vince's move.

We have published our research together (e.g., Geiger & Goos, 1996; Goos & Geiger, 1995) and separately (e.g. Geiger, 2005; Goos, 2004), and have presented many professional development workshops to share our findings with practising teachers. While this partnership has certainly been productive in terms of research output, for us the most significant benefits are related to what we have learned from and about each other and what this might mean for understanding, and perhaps bridging, the so called "research-practice gap" — the discrepancy between what we know about teaching and learning mathematics and what actually happens in mathematics classrooms (Malone, 2000). Because we think that this kind of extended collaboration between a university-based researcher and a school-based teacher is unusual, in the conversation below, which occurred in the first weeks of Vince's move to his university position, we reflect on how our professional relationship began and how it has developed and changed over time.

This paper takes the form of a heteroglossic discourse where the conversational voices of two friends and colleagues (in italics) discussing the development of their working relationship forms the basis for analytical commentary (normal font) by a voice provided by Vince and Merrilyn in their personas of educational researchers.

Different Types of Knowledge

Merrilyn: Let's begin with the first time we started working together in late 1994. Where were you in your career then?

Vince: I had been teaching for about ten years and had just finished a Masters project on mathematical problem solving in relation to applications of mathematics. I had discovered that it was one thing to read about ideas but another to put them into practice because I wasn't seeing too many of these approaches being implemented in classrooms. The classroom I invited you to visit was one where the particular mathematics subject had a small group of students enrolled and I was the only person teaching it. That meant I had lot of flexibility — more than normal, because I didn't have to negotiate anything with other teachers — so I could try out ideas. That's why I was happy to have someone visiting — I would have someone there to help me know if the ideas were working. In our particular case, because of who we both are, I had someone to talk to in the same language. This was not the traditional language of teachers — they don't often use the formal language of research. They talk about what they think is working in their classrooms, not so often the reasons why, and perhaps suggest that their colleagues should try these approaches themselves. It is a respectful, trusting approach based around anecdote.

Merrilyn: Lester (1998) highlighted this communication difference when he said that researchers frame their discourse in terms of scientific rationalism but teachers use more conversational forms of interaction to influence each other.

Vince: Exactly right. In my case, though, I'd had the experience of working on a small research project and so been involved in regular professional discussions with a supervisor. I had developed a liking for those sorts of conversations and had a desire to resume them. It had become important for me to know why, not just that it worked.

In the above discourse, Vince articulates a difference he sees in himself compared to the teaching community as he knows them; and in doing so identified a distinction between two typesof professional educational practice — that of the teacher and that of the educational researcher.

Richardson (1994) identifies differences between the processes used by researchers and teachers to improve educational practice. She argues that formal research, what researchers do, aims to contribute to an established and general knowledge base. Practical inquiry, on the other hand, is the accumulation of anecdotal evidence that assists teachers in addressing immediate day-to-day problems. This is because teaching focuses on valued outcomes, for example, "What can we do as a school to enhances the resilience of students in their day to day lives?". Research, by comparison, focuses on the production of valid and reliable explanations for observed phenomena, for example, "Can we develop an explanation for why students in this particular school appear to be unusually resilient?". The object of research, unlike in teaching, is not solve problems but to create knowledge that helps us understand a problem (Labaree, 2003).

The formal approach of researchers, described as analytic rationality by Wiliam (2003) is empirically based and seeks to develop generalizations about educational phenomena. The focus of teachers, however, is much more in tune with the needs of individuals or groups of students who are difficult to define attributionally. The result is a tension between the aims of formal research and the needs of teachers. Not only do teachers find the formal language of research findings inaccessible but the predisposition towards statements of findings as highly qualified generalizations makes it difficult for teachers to locate and then apply results and recommendations compatible with their particular contexts and conditions.

In addition, the focus of research on phenomena that exhibit characteristics that are readily operationalised and measurable, which are the preconditions of generalisability, means that the body of knowledge produced does not often provide practitioners with insights into how to make improvements to the functioning ofthe complex and "messy" world of the school classroom. So, not surprisingly, teachers seek out sources of knowledge that are accessible and directly applicable and because they cannot generally find it in education research they find it through each other.

Malone (2000) agues that the practical inquiry of teachers represents a community of researchers which should be recognized as the creators of a different type of knowledge.

> Members of this other community exchange their research findings in the staffrooms and corridors of their school between classes, often as anecdotes and stories, and they evaluate the quality of their research in a very pragmatics way — in terms of what works with their students.(p. 29)

The Advantages of Living in the Gap

> *Merrilyn:* My own reasons for beginning PhD research were like yours — I'd just finished a Masters project on mathematical problem solving and metacognition. But you were an experienced teacher and I wasn't; in fact I had worked in a school for a very short length of time. I wanted to research the idea of collaborative metacognition but I wondered where was I going to find teachers who were willing to have a stranger in their classroom — and a stranger whom they might regard as a fairly novice teacher in terms of years of experience. On the one hand, then, I was entering your classroom and deciding whether this was going to be a fruitful site for my research, but I was also very conscious of the kind of relationship that needed to be established with the teacher if this research was going to be productive. At the end of 1994 when I was doing my pilot study in your classroom I think we were really sizing each other up!
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> *Vince:* I don't know that I spent a lot of energy in sizing you up, I guess I didn't know what to expect but it never crossed my mind to make any judgments based on experience.
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> *Merrilyn:* Really? So I was worrying about nothing?
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> *Vince:* You were worrying about nothing! It was good to have someone there to talk to, maybe it was a way of validating what I was doing. I remember from the very start you only ever asked me why I was doing things, you never made any judgmental comments. And because of our backgrounds and interests there was some kind of symbiosis in that we thought the same way. I remember after the first visit I thought "That was good; having someone good to talk to". I really appreciated the opportunity to share ideas and also to have an extra set of eyes there. The interesting thing, for me as a teacher, was to think about what made it (i.e., the lesson or learning experience) happen in that way, can we replicate this? Was it just a random event or something a teacher could construct? That question became more important to me as time went on too, could we manipulate what was happening to bring about particular kinds of learning and interaction between students? But to know how it happened we needed to know why.

This transcription begins with Merrilyn expressing an anxiety about her lack of experience as a practitioner. In Merrilyn's case this is real due to her limited time as a classroom teacher. For many researchers, however, there is still an acquired inexperience brought on by the amount of time they have spent out of school classrooms, even if they were once experienced teachers. Vince, on the other hand, indicates a genuine appreciation for Merrilyn's presence because of what he sees she can bring to the their collaborative endeavour — the insight of a trained researcher; someone who can see with non-judgmental and different eyes who views the world of the classroom through an analytical lens that seeks to understand rather than to prescribe action. Being informed by this view, however, empowers Vince to develop theories of action that are aimed at the production of beneficial and predictable outcomes.

The exchange recorded above highlights the advantages offered by genuinely collaborative research programs, that is, that the inadequacies of one partner can be accommodated by the strengths of another.When trust is established teachers and researchers can work together with confidence in each others' complementary knowledge and skills. It would appear, unfortunately, that this sort of relationship is relatively rare. As observed by Heid, Middleton, Lawson, Gutstein, Fey, King, Strutchens and Tunis (2006)

> The knowledge of the classroom practitioner and the wisdom of classroom experience are often untapped in research endeavours that could benefit from that perspective. And research synthesis do not often directly address questions of concern to the field of practice. The result is a bidirectional disconnect. (p. 79)

Equitable Relationships and Hierarchies

> *Merrilyn:* That was important for me too (questions about why), it was never just an account of practice, there were always those "why" questions. After my first visit to your classroom in 1994 I had interesting transcripts that I wanted to analyse to find out how metacognitive strategies were embedded in students' social interactions. I thought this would make a good conference paper so I suggested we should write it together and present it at a national research conference (Goos & Geiger, 1995). To me that was probably a marker of the kind of equality that existed in the relationship; I was never going to take the data away and write the research papers on my own. What was your memory of that experience?
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> *Vince:* That was a really significant development. I can remember that conversation, and my reaction was "I can work with this person because they're being very fair about this." I had often been very critical of the way researchers would come in to schools and harvest everything, leaving nothing for the teacher except "Thank you" — and we would never see them again. You took a very different approach from that and I really appreciated it. It was affirming to be acknowledged in that way, especially because of where I was going with professional associations and advocacy for teachers as professionals. I thought it was very important that there were teachers standing up at research conferences and saying that we have a role in this, because talk about professional practice should be more inclusive of teachers. Teachers' voices must also be represented in research if it is to make an impact on professional practice in schools. That was also the conference where I won an award for the best paper applying research to practice (Vince, 1995), which made me start taking more seriously the possibility of doing research as a classroom teacher. I also remember the following year we wrote another joint conference paper but this time you asked me to take the lead in writing it (Geiger & Goos, 1996).
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> *Merrilyn:* That's right, you were first author on that paper.
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> *Vince:* I thought that was a very fair and reasonable thing to do, as is the way we've continued to share authorship and extended this to collaboration with our other university colleagues (e.g., Goos, Galbraith, Renshaw, & Geiger, 2003).

The conversation, here, is concerned with the power relationship that must be addressed if there is to be genuine collaborative practice between researchers and teachers. Breen (2003) argues that true collaboration can only be realised if control and decision making are genuinely shared. He observes that this is an uncommon occurrence as teachers are usually co-opted into the agenda of the university academic because they have greater access to power and resources. Further, the reality of attempting to accomplish a multitude of purposes within one research program means it will always be difficult for collaborators to realize all of their ambitions — either compromises must be made or some agendas must dominate over others. And because the rewards for engagement in research are different for teachers (i.e., the possibility of improved practice but very little by way of recognition) and for researchers (i.e., a sense of altruistic service by contributing to improved practice

but genuine acknowledgement and financial reward via promotion), a cynic might conclude that one group may be tempted to pursue their agendas more vigorously than the other.

Issues related to power, and what each collaborator wishes to achieve out of the collaboration must be acknowledged, discussed and negotiated if a collaboration is to be viewed by all involved as equitable and "fair". Merrilyn's determination to give formal credit to Vince's contributions to the products of their combined efforts is far more than the acknowledgement that there was a teacher involved in the research; it is an acknowledgement that the teacher made an equal contribution to the creation of the new knowledge reported in the relevant research papers.

Two Communities

Merrilyn: As you know, not many teachers go to those research conferences. I always wondered if you felt a little out of place; you mentioned that people occasionally looked at you in some surprise because they may have questioned whether a teacher would be able to contribute there. Do you still feel that now?

Vince: Now that I have become a university academic it will be interesting going back to that conference next year! I guess it was only some people who reacted in that way.

Merrilyn: Or is it a bigger issue about credibility of teachers as researchers?

Vince: I think there is still, to some extent, an attitude amongst researchers that teachers are not part of the main game, they may contribute a little around the edges but not in the way of major projects. Often researchers seem to think they are the only people who really know what mathematics education is all about. It seems to indicate a lack of respect for a different type of knowledge and a different culture of developing knowledge. It's strange, but recently I've noticed that teachers look at me differently now, as though I've acquired a whole new elevated status — as if I've been suddenly placed on a pedestal.

Merrilyn: You mean now you've moved to a university?

Vince: Yes.

Merrilyn: I know of other teachers who have had the same experience. They conducted excellent doctoral research as school teachers but had trouble interesting other teachers in their work — until, like you, they moved into a university position when suddenly everyone wanted to know them!

Vince: Schools assign little credit or recognition for being involved in research; it doesn't seem to be part of what a teacher should do in a school.

Merrilyn: The issue of credibility has been present in different ways throughout all the time we've worked together. For example, just as the two of us have written and published research papers, we've also presented workshops together at professional development conferences, and in those settings I've had to establish my own credibility with classroom teachers. When I started working with teachers in these ways I wondered what could I offer them, how could I communicate ideas about teaching that they would see as authentic and doable in the context of their working lives. So that's where I've really benefited from working with you: first, you have been a sounding board for testing the feasibility of ideas, and second, by virtue of my association with you, your own standing in the professional community has lent me some credibility.

Vince: As you were talking, it reminded me of times when I didn't really feel part of the research crowd at conferences, times when I remember thinking "I'll just follow Merrilyn around — this is her world." Of course, now there are always people who will come and talk to me at research conferences because I think I've gained some recognition in my own right. But it just occurred to me before, I can remember having this thought when we were wandering around a couple of teacher professional association conferences, "Now Merrilyn is in my world!"

Merrilyn: That's right.

Vince: Because of what I had done in my professional life I could move anywhere at those conferences and I knew everybody … so now I could introduce you — which was the opposite of how it was when we were together at research conferences. And I wondered how you were actually feeling about that?

Merrilyn: I felt the same way as you had at research conferences. You talked earlier about entering someone else's world — but when I started going to professional development conferences, around 1996 and 1997, I had no world of my own. I was in a very uncertain position at the university working as a casual research assistant and tutor while enrolled in a PhD, with no prospect of a permanent position after graduation. So I had to establish credibility on two fronts, academic and professional. I was eventually appointed to a tenurable position at the university and I now feel reasonably well established as a researcher… but it's very important to me that we still work together. And we've now entered into a different kind of relationship because you've enrolled in a PhD yourself. How did that happen?

Vince: I don't remember — I just woke up one morning and I was doing it! Aren't you to blame for getting me into this?

Merrilyn: Mea culpa! But you've also recently had a career change and started working full-time in a university. What has that experience been like?

Vince: I had arrived at a point where I couldn't do anything more, professionally, as a teacher, and I needed different challenges. I hadn't anticipated this move until after I had finished my PhD, but it will still be a year or so until I'm ready to submit the thesis. In the meantime I have to be patient and avoid taking on too much other work — but this is difficult because I was previously so active and professionally involved. My new colleagues are very good to me but I get the sense some are not aware of my experience or what my capabilities are. It is very much like starting all over again. And I suppose the first challenge is to prove myself again in a different professional community. I have to remind myself, often, that this will take time. The things I have done before as a teacher will help prepare me for the challenge but they will afford me little recognition or privilege among my new peers — that will have to be earned.

Malone (2000) observes that since teachers and researchers contribute to and act upon two distinct types of knowledge then it is arguable that teachers and researchers also belong to different sub-cultures of mathematics education — two distinct communities. These communities have their own language and custom and, as suggested by the above conversation, their own practices of initiation; and until you demonstrated sufficient familiarity with these practices you are regarded as an outsider. Vince's concern about his acceptance into the community of educational researchers is based around their recognition of him as a "real" researcher. His solicitude is not without foundation as concern has been raised about the quality and status of teacher research (e.g., Cochran-Smith & Lytle, 1999;Kilpatrick, 2000). Conversely, Merrilyn also expresses her anticipated difficulty in winning acceptance from the community of teachers. Our experience is that teachers hold beliefs about educators who live in "ivory towers" and will readily recall stories of advice they have received in the past based on research that has proven to be inappropriate to the circumstances encountered at their chalkface. As Merrilyn was aware, in order to gain recognition she need to establish credibility with this community, just as Vince need to do within the culture of educational researchers. The success of Merrilyn's and Vince's integrations into both communities, however, was facilitated through introduction into these communities by an individual who had already achieved credibility, that is, they were afforded a type of bridgingrecognition via association. It was then up to Merrilyn and Vince, after this initial introduction, to prove themselves in their own right.

Closing the Gap

While considering means for the improvement of the status and efficacy of education research Burkhart and Schoenfeld (2003) argue that that a greater emphasis on classroom based research is vital to the development of research programs that seek to understand the role of contextual factors in the teaching and learning of mathematics. As discussed in this paper, it is the issue of context, or rather, the inability of the field of educational research to report findings relevant to specific contexts, that leads teachers to seek out and to create bodies of knowledge they deem more relevant.

> *Merrilyn:* …So perhaps the real question is, how can researchers (the first community) and teachers (the second) work together to develop practical wisdom, knowledge based on evidence and argument that also moves people to action (Lester, 1998)?
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> *Vince:* I think that's why our own collaboration has worked so well over a long period of time, it's been long enough for you to come to know the students and what works for them and for me to know about research and what we're trying to achieve with it. It also means we know each other very well. Through this time we've developed respect for each others' particular type of knowledge and expertise. We have also learned to value each others' perspectives and trust each others' instincts. I doubt this is a typical relationship between teacher and researcher.
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> *Merrilyn:* That's occurred, I think, because all of our work together has been fuelled by conversations like this one — by communication that aims to produce practical wisdom and to reject any hierarchical division of labour between us.
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> *Vince:* We've found something that works. And we've begun to think about why. Perhaps, in time we'll be able to convince others of the mutual benefit of such relationships. All we can do for the moment is to keep talking about it to whoever will listen.

The conversations above, document one instance where a teacher and researcher have developed a productive working relationship that appears to satisfy their needs as professionals to know, to understand and to act both within the communities with whichthey would most strongly identify as well as in the "foreign" community of their collaborator. The conditions that led to this relationship include a shared interest in the improvement of educational practice and a natural curiosity that drives them to understand and not merely observe, but is maintained by an appreciation for each other's talents and skill and the realization that they have stumbled upon something that works.

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