

Chapter 2

In Conversation with Alan Bishop

Philip Clarkson

Doing a graduate psychology course with Jerome Bruner switched me on. I thought to myself, we should be doing more of this stuff (research) in education, and in mathematics education. Gee! You know! Why are just psychologists doing this stuff? Soooo I took on various tutoring jobs just to check out some things. I tutored at a mental hospital. I taught and then tutored in schools in a black part of Boston in a program that Harvard ran with gifted black kids. I also taught in 'normal' classes in middle years. This really got me interested in research on teachers in the classroom.

(Bishop reflecting on his time in Boston in the mid 1960s)

Alan was born in 1937, just before the Second World War commenced. His father was a mathematics teacher, who progressed to be a foundation principal of a new Grammar School in London. Alan's mother was a seamstress, who – not unusual for that time – concentrated on making a home for her husband and only child. One of the great joys of the family was music. His father played the violin for public performance in a trio, and his mother played the cello. Both gave Alan much active encouragement to develop his own musicality.

Alan sat for his 11 plus examination and scored enough to go to the University College School in London, a public school linked, originally, to London University. At school he chose to take a lot of mathematics and science, a lot of music and sport, all of which he has continued with throughout his life. Towards the end of secondary school, Alan successfully auditioned and subsequently played the bassoon for 2 years in the National Youth Orchestra. Clearly he had a wonderful, although for a young man, a difficult decision to make in those final years of schooling: would he concentrate on his music or mathematics? Taking the advice of a visiting musician from Holland, "Do you really want to enjoy your music? Then stay an amateur",

This chapter is mainly based on a number of conversations I had with Alan Bishop during April and May of 2008. But my conversation with Alan started with a brief question to him at a seminar he gave at Monash University in 1977. It continues through to today, in many and various locations including on golf courses, although those times should happen more regularly. Clearly the assertions and interpretations in this chapter are mine, although the dates and events have been checked with Alan.

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Alan choose to continue his studies in mathematics, with music and of course sport as his second level studies.

At the conclusion of his secondary education in 1956, Alan chose to complete 2 years of national service. He entered the air force and spent most of that time as an air-radar fitter, which essentially meant trouble shooting the huge analogue computers then in use for navigation. This was Alan's first introduction to computers, and since this was 20 years or more before computer technology became widely available in society, he was considerably ahead of the game. On completing national service he presented himself for an interview at Southampton University, a normal part of the selection process. During the 30 minute interview, the Professor of Physics was far more interested in learning what Alan knew about computers, regarding his application for selection as a mere formality.

Alan had chosen to apply for Southampton since while concentrating on mathematics in his program, there would also be opportunity for music and sport as well. During his first year of study, he had the great fortune to meet up with Jenny, a talented linguist. They subsequently married, and still are supporting each other. His tutor turned out to be Bill Cockcroft, well known later for writing the Cockcroft Report in 1982, which advised the British government on strategies for revamping school mathematics. Interestingly it was just as much their common interest in jazz that sealed the beginning of a long friendship between Bill and Alan.

The notion of becoming a teacher had formed for Alan in his senior years in secondary school. He chose to pursue this interest by moving to Loughborough College on graduation from Southampton, since there he could undertake a 1 year Diploma in Education, not just for mathematics teaching but also in Physical Education. Alan was still in contact with Bill Cockcroft who suggested on the completion of his Diploma that he should apply for scholarships that would allow him to study in the United States, and incidentally get to know something of the interesting curriculum moves being made there with the so called "new math". Alan did win a scholarship through the Ford Foundation, so he and Jenny, now married, were off to Harvard University in the United States to complete an MA in Teaching. Although the scholarship was for 1 year, they stretched it out for 2 years, supplementing the scholarship monies with tutoring. They managed to stay for a third year by taking on full time school teaching in a local high school. Hence while taking classes with the likes of Jerome Bruner, Alan was teaching the new School Mathematics Study Group (SMSG) mathematics in high school, a wonderful preparation for his then glimmering idea of becoming a researcher in education. This glimmer of an idea is captured by the statement from Alan at the head of this chapter. It was at Harvard he started to see the possibility, and the excitement that can be generated, of doing good research.

Heading back to England after their stay in the United States, Alan rejected various school teaching jobs at top public schools, some of whom were teaching the new School Mathematics Project (SMP) mathematics curriculum, which would have ensured him a stable and well provided professional life. He was clearly well qualified for such jobs. But he rejected these lucrative offers, preferring instead to pursue this dream of researching in education. Hence he applied for and was appointed to

a full time research fellow position at University of Hull working with Professor Frank Land. Unbeknown to Alan, Bill Cockcroft had moved to Hull, taking up the position of Dean of Science and Warden of one of the University Halls. Alan was delighted to take up the offer to be Deputy Warden to Cockcroft for his first 2 years at Hull. Apart from anything else, it provided him and Jenny with a free flat in which to live.

Land's 4 year project on which Alan was to work was centred on visualisation and the impact of this on mathematics learning. Although the project was very much in the psychology mould of doing research, nevertheless it was a project that was being carried out from within education. It was this subtle change that had excited Alan's interest at Harvard. Here at last he was starting to act out the idea. The project was basically assessing secondary school students on a range of visualisation and spatial ability measures, and on a number of attitude scales to do with mathematics. The students were also asked which primary schools they attended. At that time the primary education these secondary students had experienced in mathematics, formed a naturalistic but classic design for a research study. By ascertaining which primary school they had attended, the secondary students could be grouped into one of three groups: those who had completed their primary mathematics learning with the use of Cuisenaire materials; those who had used material devised by Dienes such as his MAB blocks and his logic blocks; and a third group who had experienced a traditional textbook resourced program. Interestingly those students who had used the various block materials in primary school, either Cuisenaire or Dienes materials, did much better on the spatial ability and visualisation tests, and had a much better attitude to geometry. The crucial aspect however of the study was later seen to be that the apparatus that the students had used in primary school was developed to help teach number concepts, not geometrical concepts, nor spatial abilities, nor visualisation. However it was in geometry that the real impact was made: this result seems obvious today, but in those days it was not so. These notions clearly linked with ideas that Alan had come across in the classes he had attended given by Bruner some years earlier. For Alan a real interest in visualisation and indeed spatial *abilities* of children grew, and this interest actively engaged him for the next 15 years or more. More comment is made on this focus in Section 3 of this volume.

At the conclusion of the project, and the completion of his doctoral studies in Hull, Alan moved to Cambridge University to take up a lectureship in the Faculty of Education that lasted for the next 23 years. He notes that he was regarded as an unusual appointment, because he did not come with the then normal 15 years or more of school teaching experience. Fortunately Richard Whitfield had gained an appointment in science education in this Faculty just before Alan's appointment. Whitfield also came with a research background rather than many years of school teaching experience. Interestingly Whitfield had been 1 year behind Alan at the same secondary school. Hence it is no surprise that once Alan had accepted the offer of an appointment, he and Whitfield joined forces to try to enliven the Faculty with a research program of their own.

The key to their project was to focus on the teacher in the classroom. Alan comments that then there were psychologists of various hues interested in studying the

learner, often in “controlled” conditions out of the classroom, but gradually more and more working with the learners in the normal classroom situation. There were also curriculum colleagues more interested in *the* mathematics, thinking through what topics should be taught, in what order they should be taught, and since the break with the ossified traditional curriculum had been made, what resources could be brought in to help students learn. Many of the curriculum workers started to become aware of the psychologists and their findings on learning. But very few researchers were prepared to focus on the teacher in this mix.

The other critical ingredient that made this type of research possible at Cambridge was that they had access to video tape and video recorders. The video equipment was located in a suit of rooms in the Engineering Department. Hence bookings for it and relocation of students from their normal classrooms became a necessity. But nevertheless this apparatus gave the possibility of recording teachers teaching in situ, and then later replaying the recording and stopping the action at critical points to ask what became Alan’s central question; “What might the teacher do next?” In listing possibilities of action before knowing what actually did occur, discussing them, and then evaluating these possible actions, Alan found a very powerful way to engage both practicing and beginning teachers in analysing their own and other’s teaching. Hence this aspect of his research became known as the “teacher decision-making” phase. This became the enduring focus for Alan throughout his research career. In one way or another he has been asking, “And how will the good experienced (not the ideal) teacher teach the mathematics?”

As Borko, Roberts and Shavelson note in their chapter (this volume), the research on teacher decision-making did not take root in England to spawn an enduring research agenda. They go on to examine what then happened in the USA. However the echoing legacy of this research in England was not recorded in the research literature. In many tutorial rooms, both in England and parts of Australia used for pre service programs, video recordings of teachers are still being used in the way that was thought of in Cambridge in the early 1970s, the aim being to foster in inexperienced teachers, the ways of doing that experienced teachers just seem to know is correct for this moment and context. More comment is made on these research activities in Section 2 of this volume.

Clearly “doing research as educationists” was a novel idea at Cambridge at that time, as it was up to the early 1970s in Australia and elsewhere. Bishop and Whitfield were challenging a very fixed idea. It was all right for other disciplines to research learning, teaching and indeed all aspects of education. But those who practiced education as a craft really had no role as researchers. That notion seems quite quaint today.

During his time at Cambridge his engagement with a broad range of activities and people grew considerably, so by the time he moved to Monash University in 1992 he was a well known international academic with a rounded research pedigree. At Cambridge he was active in various ways within mathematics education in England, becoming a frequent speaker and convenor of workshops. He was active in various professional associations, including the Association of Mathematics Teachers (at one point Chair), the Mathematics Association (President for some years), and the

British Society for Research into Learning of Mathematics. One incident is instructive concerning his involvement with such associations. Alan tells of his attempts, alone and with others, to try to integrate the various professional mathematics associations during the 1980s, but to no avail. His concern was to have a strong united front, as mathematics education, as well as education generally, came under ever increasing pressure during the Thatcher years. To hear him speak of this time is to sense a deep regret that he and colleagues had not been able to make more headway on this political agenda.

However, working with individual teachers and small groups of teachers Alan always found profitable and exciting. He recounts a story of events that happened after he gave a talk for the Association of Mathematics Teachers on research in the early 1970s. Someone asked him at the conclusion whether ordinary teachers could engage in research themselves. Alan replied that essentially yes, although there were some protocols and procedures with which one should become familiar, and work within. He was then challenged directly after the talk by a small group of teachers who wanted to get going with some of their own research. From this interaction a small informal group of teachers grew, who did continue to engage in research in their own schools on their own teaching, with Alan as a mentor. The group included people like Geoff Giles, Kath Cross, and Bob Jeffreys. It began in 1972, developing a small but interesting series of studies using what would today be called action research.

His work gradually broadened on to the international scene during the 1970s. Part of this was through the people he had opportunity to meet. For example, the beginning of a long friendship, as well as opportunity for a rich academic partnership began on meeting Jeremy Kilpatrick for the first time at an invited working group in France in 1971 (see Kilpatrick's chapter 14, this volume).

These opportunities expanded when Alan, with others, developed and then began to teach an M Phil research degree program in mathematics education in the early 1980s at Cambridge, and also at about the same time began supervision of doctoral students. To comment on this today seems to be noting not much out of the ordinary, but it was then quite different. The earlier battles for engaging directly in research within education were starting to bear fruit, but even so there was still the lingering notion that practice was the normal and perhaps only aim of education, with research in education to be conducted by other more qualified social scientists rather than educationists. This meant another interesting difference, compared to the environment of today. Then there was much less pressure for tertiary education staff to have a coterie of research students. Alan notes that from time to time he would advise potential candidates to enroll elsewhere when he knew that they would be supervised by someone who had a deep interest in their particular set of research questions, rather than "grabbing" all candidates that came one's way, which is a tendency for some staff today. This mutual trust of colleagues across universities within Britain also helped meld the small but growing community of mathematics education tertiary staff into a very active supportive research group.

In taking these steps of engaging with teaching in research programs, Alan was brought into contact with colleagues from a number of countries. His first two

doctoral students were Lloyd Dawe from Australia, and Norma Presmeg then from South Africa. The variety of students who enrolled in the 1 year M.Phil. program is also impressive: many have gone on to hold various positions in their own national professional education associations, as well as on the international stage. For example, Fou-Lai Lin, who was already a highly qualified mathematician and highly placed in the research administration in Taiwan, enrolled in the M.Phil. as his ideas turned to mathematics education. From the early days there was also Bill Higginson from Canada, and Renuka Vithal and Chris Breen from South Africa.

Alan also became active in international organisations. He attended the first International Congress on Mathematics Education (ICME) in 1969, and has since convened various groups for these conferences through the years. He was a founding member and co-director for 5 years of BACOMET (Basic Components of Mathematics Education for Teachers), an invitational international and hence multicultural research group that began in 1980 and continued to meet for more than 10 years. At times Alan held various positions in the International Group for the Psychology of Mathematics Education (PME) including being a member of the International Committee.

An important event that typified his work within these organisations concerned the year that PME was to meet in London during the mid 1980s. This was the time that world attention had finally turned to the apartheid question in South Africa. In line with a boycott of all things South African, there was a move to ban South African academics from attending the PME conference that year. After much arguing, the ban on the South African attendance was lifted, although the question was raised at the annual general meeting of the organisation. At Alan's suggestion, PME decided from then on not to ban attendance at the conference of any identifiable group of mathematics educators, even if such a ban could be seen as support of an acceptable political stance. Rather PME should find ways to support the attendance at its conferences of colleagues who are disadvantaged because of political situations, and such like. Putting this notion into action was another matter. An approach to UNESCO through Ed Jacobson by Alan to fund the publication of a book proved fruitful: the profit from the book was directed to PME. These monies became the founding amount for what has become the PME Skemp Fund, which continues to support the travel of colleagues who otherwise would not be able to attend PME conferences.

One of the mathematics educators that was influential in Alan's thinking was Hans Freudenthal. Freudenthal had founded what became one of the important international research journals in mathematics education, the *Educational Studies in Mathematics*. Alan was invited to become the second editor of this journal in the late 1970s (see Clements' chapter 7, this volume, for more discussion). He remains an advisory editor to this journal. This began for Alan a long association with the Kluwer Academic (now Springer) publishing house. In 1980 he founded and became the series editor for their Mathematics Education Library book series, a most highly regarded series that is still attracting authors. Within this series first in 1996, and again in 2003, two important two-volume handbooks were published that canvassed the state of mathematics education research worldwide.

However the most significant event that occurred during his time at Cambridge was in 1977. During the previous year Glen Lean from the Papua New Guinea University of Technology had visited Alan in Cambridge wishing to discuss with him the spatial abilities research that Alan had been involved with for 10 years or more. Glen's aim was to elicit support for the university students he was teaching who seemed to have great difficulty in mastering and understanding the geometry in the first year mathematics they had to study. Glen left with a parting invitation to Alan to visit sometime. Glen's visit certainly intrigued Alan. As it happened, Alan was planning to undertake a year of sabbatical through the 1977 academic year. An invitation had arrived from Professor Peter Fensham to spend some time at Monash University to work with Ken Clements. There was also an invitation to go to University of Georgia at Athens, USA, to link up with Jeremy Kilpatrick. Hence a year long round the world trip was planned for the family (by then Jenny and Alan had two sons) starting with 3 months in Papua New Guinea, then moving south to spend 5 months at Monash in Melbourne, Australia, and then finally travelling across the Pacific to spend time at the University of Georgia. It was the 3 months in Papua New Guinea that made the difference.

"He changed" Ah ha! Yes he did.

(Alan commenting on the first paragraph of Section 4 Introduction, this volume)

Ken Clements comments in his chapter (this volume) on the aftermath of Alan's Papua New Guinea visit in some length. This visit refocused Alan's interests in mathematics education away from his work with spatial abilities on to work with the impact of the social, cultural and political aspects on the teaching of mathematics. It seems, however, that this was not the first time that Alan had considered these other factors (in the traditional research way of thinking), or aspects of the educational environment, to say it a different way. A diagram first used by Bishop and Whitfield in the early 1970s, and reproduced in this volume by Borko et al. as Fig. 4.1 (see the introduction to Section 2, this volume), clearly has rectangles that suggest that during the 1970s Alan was well aware that the social, cultural and political aspects were important in understanding how teachers teach. His own experiences of school teaching in deliberately varied environments in Boston in the mid 1960s also alerted him to their individual and collective importance. A somewhat different experience in 1969 had also given Alan pause for thought. This concerned cross-cultural issues and forewarned him in part of the intricacies in trying to understand what was happening in such contexts. This experience was a keynote address at the first ICME conference given by Professor Hugh Philips from Australia, who reflected on his research conducted in Papua New Guinea. Philips' discussion of cross-cultural issues, which were mainly anchored in his Piagetian psychological studies with school students learning mathematics, fascinated Alan at the time. He spent some time talking with Philips at that conference. But even given these precursor experiences, it was his own experiences while living in Papua New Guinea that transformed Alan's thinking. No longer for him were the social, cultural and political issues of some importance; they became *the* important issues with which he needed to try and come to grips, as far as teaching mathematics was concerned.

Clearly Alan's concentration on these concerns can be seen in the headings used for the last four sections of this volume. The ways he chose to be involved with various professional groups noted above also indicates his new refocusing on these issues. His thinking was also stimulated by the small but engaged group of full time international students who came to Cambridge to enroll in the 1 year M.Phil. program that Alan started (see above), and the increasing numbers of doctoral students, again many from overseas. Within such a multicultural group, with most of the members already having substantial experience in education, Alan was able to test many of his own ideas as he sought to push himself into thinking through the implications of the political, cultural and social issues that impinged on mathematics teaching.

The key output from these years of reflection emerged as two books. The first is one of the most referenced volumes on mathematics education research, *Mathematical enculturation: A cultural perspective on mathematics education* (1988). Its sequel, which many do not realize is such, was the much later edited book by Abreu, Bishop, and Presmeg; *Transitions between contexts of mathematical practices* (2002). A plan that Alan had formed in the early 1980s, prompted by his Papua New Guinea experiences, was to develop two books, one on enculturation and another on acculturation. He was going to start with acculturation, but turned from that, being undecided on just how best to deal with the core notion, since he had never had to experience it directly. He then turned his whole attention to what enculturation means for mathematics teaching. Norma Presmeg, in her biographical notes in Chapter 1 (this volume), briefly comments on being a sounding board in the mid 1980s for Alan's ideas as the book came to fruition. One is not sure whether having lived in Australia for some 6–7 years, Alan finally felt he had some experience of acculturation, and hence was in a position himself to explore the long delayed second part of this writing program. Whether or not this is so, he interestingly had come to a way of breaking his blockage on this issue. Rather than deal with the idea front on by himself as he had with enculturation, he chose to think through the nuances of the idea, with a group of colleagues, using notions of transitions and indeed conflicts between cultures.

As noted above, Alan moved to Monash University, Australia, in 1992. This was not an easy move. It meant leaving their two grown boys back in England, and an aging parent. However the idea of growing old and crusty in an English establishment university was not the way Alan wished to finish his academic career. The move to Monash was attractive. It did mean promotion to a professorship, something that is not always a given in a place where one has been a long time. Both he and Jenny had enjoyed their extended stay back in 1977, and on subsequent visits had been made most welcome. He felt there were staff in the Faculty with whom he could easily form a working relationship. By this time Ken Clements had left Monash, and was on the staff at the Geelong Campus of Deakin University, a rural city about an hour's drive from Melbourne. Another interesting connection was that Glen Lean, who had inspired Alan's first visit to Papua New Guinea, was by then also on the staff at Deakin.

During his years as a paid staff member at Monash, from which he officially retired in 2002, Alan was heavily involved in the administration of the Faculty. He avoided the role of Dean with skilful footwork, but had different roles as Associate Dean, at various times, for Research, for International Affairs, and then as Deputy Dean, as well as being Head of the Mathematics, Science and Technology Group within the Faculty for some years. This of course meant membership and chairing of various Faculty and University committees. The time devoted to such increased through the 1990s as Monash, like universities elsewhere, moved totally into the age of performativity and the attendant “need” for documenting everyone’s activity to the nth degree, so that the organisation could work within a so-called “culture of evidence”. Needless to say, much time was taken away from the core work of a high profile academic.

An early project that Alan worked on soon after arriving in Australia was to initiate the planning for an international regional conference through the agency of the International Commission on Mathematical Instruction (ICMI). This notion of ICMI supporting initiatives in particular regions of the world was not new, but certainly none had been contemplated for the South East Asian/Pacific region. However support was not always forthcoming from the Australians. In fact few in Australia had active involvement with the ICMI organisation, although they were regular attendees at the International Congress on Mathematical Education (ICME) four yearly conferences. Indeed when beginning the organisation for what eventuated as the 1995 ICME Regional Conference, no one in Melbourne was quite sure who was the Australian delegate to ICMI. Although such connections had been built for and during the 1984 ICME Conference held in Adelaide, Australia, 8 years later, interest in being actively engaged with this world wide organisation for many had waned. Hence those who had promoted the 1984 conference still held positions, even though lines of responsibility for action back to the mathematics education community were by then decidedly blurred. Alan’s initiative inadvertently stirred up quite some angst. However the conference itself, although not as well attended as was hoped, still proved to be a success and cemented many connections between colleagues in Australia and overseas.

Although Alan continued writing on issues that he had started to think about before moving to Australia, he initiated two crucial research decisions. First he returned to the notions of what acculturation means in the mathematics education context. As noted above, this initiative finally produced an edited book, a conclusion to his original speculation some 20 years earlier on enculturation and acculturation. The other decision was to concentrate on values. This was not something new in Alan’s thinking. The term appears in the diagram he and Whitfield used to conceptualize their ideas on teacher decision-making in the early 1970s. He had also begun to write quite explicitly on values by the early 1990s. By the mid 1990s Alan was ready to actively push the door of the classroom open again, and see what impact teachers’ values had on their decision-making in the act of teaching. Thus began the Values and Mathematics Project (more comment on this is made in the Section 7, this volume). An Australian Research Council (ARC) Grant funded the original

project. A subsequent project was also funded by a second ARC grant, but this time Alan joined with science education colleagues at Monash to broaden the scope of the investigation; an interesting turn of events which is reminiscent of his work with Whitfield, a science educator.

After a brief time in Melbourne, Alan linked with the local regional association of mathematics teachers, Mathematical Association of Victoria (MAV), for whom he had previously given seminars and a keynote presentation at their annual conference in 1977 (see Chapter 14, this volume). In this way he connected again with teachers who had been so much the centre of his research. He was a member of the MAV policy committee for some years. He also worked with the national professional group, the Australian Association of Mathematics Teachers (AAMT), to direct a project called Excellence in Mathematics Teaching. This was a joint project between Monash University and the teachers' association, and was funded by another ARC grant, with additional funding from various state government Ministries of Education. The main outcome was the development of a fully researched and trialled program that was aimed at senior mathematics teachers. The program led the teachers through some recent and relevant research, looked at some leadership issues pertinent for a mathematics coordinator, and also importantly included an emphasis on teaching skills. The teaching skills were not just discussed, but teachers were asked to view and analyse teaching episodes captured on video using the technique Alan had pioneered years before, as well as having some of their own teaching in their classroom observed and critiqued by others.

On coming to Monash, Alan had to take over the supervision of some research students who had been left without supervision with the retirement of other senior staff. However it was not long before additional local students and some from overseas were under Alan's supervision. His extensive travelling program helped this process. Mirroring his efforts at developing a group ethos among students at Cambridge, it was not long before monthly late afternoon seminars became the norm. The nucleus of these seminars were always Alan's research students, but also in attendance were often students being supervised by others in the Faculty, other interested staff colleagues both at Monash and from elsewhere, overseas or other visitors to the Faculty, and any research assistants employed to work on one or other projects then current. Clearly these categories were not always discrete, often including research students employed as research assistants, and staff members from elsewhere undertaking doctoral studies with Alan.

Among the overseas students that did come to work with Alan were some from Papua New Guinea: Wilfred Kaleva now Associate Dean of Education at University of Goroka, PNG, and Francis Kari. Such connections also enabled return visits to PNG from time to time, which both Alan and Jenny thoroughly enjoyed.

A bitter-sweet moment arrived mid way through the 1990s. Glen Lean, who had been the instigation of his first visit to Papua New Guinea, by then had developed into a lifelong friend. Glen became over the years another close and trusted critic (in the best sense of that word) for Alan's thinking about cultural impacts on mathematics. At the same time Alan became Glen's doctoral supervisor. Although Glen began his studies on the original issue that had led to his seeking Alan out (spatial

abilities), after some years the study changed to a study of the mathematical systems embedded in the 800 plus languages spoken in Papua New Guinea. Glen was never good at consistently writing for his doctorate, and it must be one of the longest (timewise) doctoral studies ever completed. However, when it was finally finished, the four volume study, a cross between anthropology and mathematics education, preserves number systems and their analysis that are now dying out through lack of use, as the western system of education takes a real hold in that country. The thesis was finished after Glen had completed 21 years teaching in PNG, and joined the staff of Deakin University. However by the time of his graduation, specially arranged in Melbourne with the attendance of the Vice Chancellor of the PNG University of Technology, Glen had only months to live. Thus ended a lively, deep and thoughtful academic friendship.¹

As Alan's time of retirement from the Monash academic staff approached at the end of 2002, his then current and past research students grouped together to nominate him for the University's Excellence in Research Supervision medal. He was subsequently awarded the medal at a graduation ceremony. On retirement, the University also granted him the accolade of Emeritus Professor, as recognition of his high quality contributions to the University across the areas of research, teaching, and in other ways.

In preparing to write this chapter I asked authors of the chapters contained in this volume what questions they would ask Alan if they were doing what I was about to do. Some of those questions and reflections have been embedded into the narrative above. However two remain with which it seems fitting to end. One was from Ken Ruthven who wanted to know "Looking back on your career, when and where were the occasions and situations that you felt that there was good (or better) alignment between the concerns and interests of mathematics education researchers on the one hand, and mathematics teaching practitioners and professional leaders on the other? What can we learn from these occasions and situations that might help develop and sustain such alignment?" In canvassing this question with Alan the conversation turned to those times when events from outside seemed to force themselves on to the concerns of mathematics education at large. There was the scare in the west of the Sputnik launch by the Soviet Union, and the question of whether the west was falling behind. The "something that had to be done" was, in part, the improvement of mathematics and science in schools. This took on different forms in England and the USA, but few of the proposals began within the mathematics education community. Teachers, professional leaders and those in universities had to respond and they in most part did so in concert with each other. The same happened with the first big influx of non-English speaking migrants into our schools in the 1960s and 1970s. The emphasis here was on the obvious language issues, and again there was some coming together to find solutions for praxis. Interestingly we seem to be revisiting this issue, but now in a broader way with the recognition of the multicultural mix in

¹ Glen's study can be found on the web site of the Glen Lean Mathematics Education Research Centre of the University of Goroka, Papua New Guinea: <http://www.uog.ac.pg/glec/index.htm>.

our classrooms, not just the embedded issue of language. Another issue that had all players in England asking “What do you do?” was the political decision to develop comprehensive schools, and hence mixed ability classes became the norm. Another was the rise of electronic calculators and computers, which came to schools via the business world. It seems that on each of these occasions when change was imposed from outside, at these times disparate sections of our community looked to each other for mutual support to find a way, first, of coping, and then to build again good praxis. These are the times we know we don’t know, and hence we get together. More’s the pity it takes such occasions for us to come together. Hopefully one day we will go beyond guarding our own small patches of turf, and realise that we are actually playing on the same sporting field.

Wee Tiong Seah’s question picks up a slightly different but perhaps broader issue: “What do you identify as the main barriers to educational change today? How can our colleagues in research rise to this challenge?” Our discussion of this question seemed to dovetail with that driven by Ken’s question. In seeking to become a profession, we in education seem to be very good at the moment in finding or creating barriers among ourselves, so that we have an identity that distinguishes us from the rest. And once there is a barrier, it has to be defended. But although at times it is good to have a robust identity, this should not prevent the crossing of the barrier to gain greater insight into problems that present themselves to all educators, no matter what type of hue we have (or think we have). Team research and easily accessible forums, which enable us to continue to speak and listen with each other, are always needed for the community to cope with the changes that often originate from elsewhere. It certainly seems we are being placed in a parlous state, at least in Australia, where good research teams are being asked to compete against each other for access to government monies to deal with issues that are of concern to all.

It has been an interesting experience to write this chapter. Not all of Alan’s brilliant ideas, once put to the test of the classroom reality, have always come through with flying colours. He has not always won his political battles, although giving it his best efforts. You cannot mistake him for a god of mathematics education, or maybe even a guru, although his family name might lead some to think he is at least on the correct trajectory for one or other of those titles (well maybe in some after life). But what you can say about Alan is that he recognised early in his career that research needed to play a role in education, and in particular in the investigation of better ways to teach mathematics. Part way through his career he took notice of his experiences and strayed further from the orthodox research road that many of his colleagues were treading. Through all of this, his contributions have made a difference to many throughout our worldwide community in making others think more deeply about their untested assumptions, and indeed what they believe and why. And we acknowledge him for that.

I finish with a comment made to me by probably the youngest author contributing to this volume.

His ability to not just think outside the box, but to do so in ways that are anchored to established knowledge and understandings separates Alan from others. This certainly has made it easier for real connections to be made in practice and research.

(Wee Tiong Seah)

This chapter does not end here. As noted in Chapter 1, each of the following six sections begins with a brief introduction. These together should be seen as a continuation of this chapter.

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