

# Methodology Challenges and Constraints in the VAMP Project<sup>1</sup>

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Values are taught in every lesson. However in mathematics classes this seems to be implicit rather than explicit. This paper outlines methodological difficulties encountered in researching the values teachers teach. One crucial area that has emerged is finding a common language with which meaningful dialogue can occur. We also reflect on some methodological questions which we have had to ask again as we have thought about the 'parallel' project in Taiwan.

Values in mathematics education are the deep affective qualities which education aims to foster through the school subject of mathematics (Bishop, Clarkson, FitzSimons & Seah, elsewhere in these proceedings). They are a crucial component of the classrooms affective environment. Although values teaching and learning inevitably happen in all mathematics classrooms, the teaching of values appears to be mostly implicit. Thus it is likely that teachers have only a limited understanding of what values are being taught and encouraged. Values are rarely considered in any discussion about mathematics teaching. A casual question to teachers about the values they are teaching in mathematics lessons often produces an answer to the effect that they do not believe they are teaching values. With this scenario of teachers not fully understanding what they do in the act of teaching, it is an interesting situation to attempt to observe, measure, or even discuss such implicit aspects of their action. Hence the challenge in this project was not only to decide what were key questions to ask, but to develop an appropriate mix of investigative strategies that would help us gain some insight into this area of teaching. This paper reflects on the strategies we have been using, while the third paper in this symposium (FitzSimons, Seah, Bishop & Clarkson, elsewhere in these proceedings) reports on preliminary data.

## *How do you research values?*

The methodology we have used is rather traditional in some aspects. Essentially we have opted for an interlocking approach at two levels - micro and macro. At the micro level the approach is to work with individual teachers using a cycle of preliminary interview, a classroom observation, and a post-observation debriefing interview. This cycle is repeated with the same teacher two or three times. The classroom observations are video taped, and the interviews audio taped. We plan to analyze the audio tapes but not the video tapes. The video tapes will be used solely to capture episodes from the classroom to stimulate discussion with the teacher during the debriefing interview.

Using this strategy we are looking to see whether teachers can articulate their own intended values, and whether they can implement these in their classroom. Hence in the

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preliminary interview we will be asking teachers to nominate values that they suspect will arise during the lesson we will be observing. In other words the teacher will have the opportunity to plan for the teaching of particular values. During the observation lesson we will be looking specifically for these values nominated by the teacher. We are not nominating particular values and asking teachers to teach those. Nor are we choosing a methodology that has us observing lessons in a rather random way, hoping to observe values that happen to be taught. We are keen to make the process open for the teachers and to see whether they actually teach the values which they have nominated. We believe this approach is rather novel in education research. It not only asks teachers to reflect on their teaching behaviour and to say what values they are teaching; it also asks for authentication of the teacher's analysis by seeking to observe the stated behaviour in a classroom situation devised by the teacher.

In the observation lesson we will be taking particular interest in the critical decision points during the teaching. These critical decision points are times in the flow of the lesson when the teacher needs to make a decision that will influence the direction the lesson takes. It seems to us that it is in those decision times that the influence of values that the teacher is teaching may be most clearly evident. Clearly at these decision points, values are not the only influence. School policy, the physical situation within which the lesson takes place and so forth will also play at times a more dominant role than the values that the teacher may be teaching (Bishop, FitzSimons, Seah & Clarkson, 1999). Nevertheless, the implementations of values will also play a role in the decision making.

In the post observation interview the video tapes will become the central prompting device for both the researcher and the teacher. We hope that the teacher will be able to remember points in the lesson at which they thought they were teaching the identified values. They will be able to use the video tape to help prompt their memory and elaborate on these episodes for the researcher. As well the researcher will also have noted points at which values teaching seemed to be occurring, and the use of the tape will help the teacher recall these episodes. The aim of the debriefing interview is for the teacher and researcher to come to a shared agreement on some particular examples of when and how values teaching occurred in a particular lesson.

Later we plan to use a similar methodology to pursue another aim of the investigation. The major change to the methodology will occur in the preliminary interview. We will no longer be asking teachers to nominate values that they normally teach, and from this broad set specify some which they suspect will be given particular emphasis in the coming observation lesson. Rather we will be asking teacher to implement some value(s) in the observation lesson that they do not normally teach, but on reflection they think they should be teaching. This change of emphasis will give further insight into how much control teachers may have over their teaching of values.

In piloting these techniques, and gathering some support from interested teachers, we have run a series of professional development sessions that incorporate some video clips of a teacher working with a grade 7 class. The video is stopped at what seemed to be critical decision points. The participants in the sessions were asked to nominate the options that the teacher had at these points. Subsequent discussions developed on influences that could have impinged on the various options available, including possible values. As well as the video, we presented a number of written episodes which were used to provoke teachers' thinking regarding the options they might have in classroom situations, and the underlying constraints that might be present. In particular, each discussion was finally directed to trying to decide what influence teachers' values might have. Both these approaches worked well giving us confidence in the use of videos to stimulate recall of critical

decision points, and the use of written scenarios in preliminary talks with teachers.

It has been instructive to reflect on the discussions we have had with six groups of teachers that indicate other issues for consideration. Perhaps the crucial finding from an analysis of our field notes taken during these sessions is the lack of an appropriate and shared vocabulary to discuss the types of values in which we are interested; that is values based in mathematics and mathematics education. The language involved in this investigation, and indeed in the transmission of values implicitly or explicitly in the classroom, is crucial. Indeed, this project essentially revolves around finding ways to make values linguistically explicit. This of itself will not lead to explicit values teaching. Rather, it will lead to a shared understanding between teachers and researchers. Because of the nature of language, a cultural artefact itself, one of course can never be sure that certain words do capture a shared meaning, or value in this case. If a shared understanding is accomplished, then we may be in a position to move to a further project that will involve examining the transmission of values from teachers to students. Both teachers and ourselves have struggled to find appropriate language so that these ideas - which are still being formed, reformed and refined - can be communicated in a positive manner.

As a research team we have always been conscious of this problem. In the research literature there have been many attempts at linking teachers' beliefs to their teaching of mathematics (McLeod, 1992; Southwell, 1995; Thompson, 1992; Tirta Gondoseputro, 1999). However the results of this research are equivocal (Bishop, 1999). Although some studies purport to find clear linkages, others do not. As Neuman (1997) suggests, subsequent actions need not necessarily correspond with stated intentions. A number of studies on beliefs were in the nature of self-reports, but there appears to have been few attempts to follow up these self-reports to see whether the teachers actually act upon their beliefs. For a variety of reasons we do not always act on our beliefs in certain situations. We wondered whether this explained some of the confusion in the literature. Hence one of the meanings we bring to 'values' in this study is the notion that 'values are beliefs in action'. That is, the values that teachers are teaching in the mathematics classroom are not only beliefs the teacher holds, but their behaviour in the classroom actually point to these beliefs. These are what we call 'values'.

But this in itself is too simplistic, even if it gives us a touchstone to work from. In our own discussions, and in the professional development sessions we have conducted, various notions are clearly embedded in this notion of 'value'. We summarize some of these in Table 1.

In a very real sense, this problem of language was inescapable. As noted above, a central feature of this project is to explore together the linguistic framework that we as researchers and teachers will use to try and share our understanding of the values that they teach in their mathematical classrooms. Thus it was decided that a set lexicon to be made available to teachers involved in the project was neither possible nor practicable.

Table 1: Aspects of meaning either used in or arising from discussion with teachers

General meanings of 'value'	Mathematical values (after Bishop, 1988)	Mathematics educational values
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To value:	Openness	Clarity
• to command	Mystery	Flexibility
• to praise	Rationalism	Consistency
• to heed	Objectivism	Open mindedness
• to regard	Control	Persistence
A value is:	Progress	Accuracy
• a standard		Efficient working
• a thing regarded to have worth		Systematic working
• a principle by which we live/act		Enjoyment
• a standard by which we judge what is important		Effective organization
• something we aim for		Creativity
• qualities to which we conform		Conjecturing

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‘Conflicting values’ was another issue that has arisen in our discussions with teachers. When contemplating the different situations it became clear that teachers are in difficult situations at times. For example, a teacher wishing students to develop an investigative stance to a project, and the students themselves, may wish to achieve closure at different points. In resolving this issue it may be that the teacher will need to draw on another set of more deep-seated values to resolve the conflict. On the other hand, the situation may be resolved from other sources, for example the submission dates set by an external examining body over which the teacher has no control.

As well as the micro investigation with individual teachers, we have developed a macro approach consisting of a survey that also gathers teachers’ ideas on the values they teach. The survey has clusters of items built around the themes of teachers’ understanding of values - specifically, (a) values teaching in the mathematics classroom, (b) institutional and socio-cultural influences, (c) mathematical values, and (d) mathematics educational values - as well as teacher control over these values.

The issue of language also arose when piloting the survey form. For the items using a forced response format, a certain amount of rewording had to be undertaken to clarify the ideas we wished to interrogate. However the two major results from the piloting of the survey involved other issues. The teachers’ responses showed that they are without doubt interested in the ideas of values, and their teaching of them; they recognize the importance of these notions and the need to investigate them. However associated comments indicate that these are new ideas for the teachers who clearly have not hitherto recognized that their teaching of mathematics does involve teaching values.

Lastly, a common theme we have detected running through responses from piloting the survey form and during the professional development sessions has been the presence of a certain amount of apprehension from the teachers. The subject of ‘values’ seems to immediately provoke in many teacher notions of judgement and finding fault. This may be a comment on our society, but it is an aspect of this project that needs to be taken very seriously. This in part is a language issue, but also means that we need to be scrupulous in respecting the teachers’ personal value systems. We have become even more conscious of the role a teacher’s personal value system may play when reflecting on a parallel project in Taiwan.

### *Taiwan research*

It was always planned and hoped that parallel projects would evolve overseas; it was expected that different cultures might well have an important influence on how and what values are taught in mathematics classrooms, and how one should try to investigate them. Colleagues in Taiwan, led by Professor Fou-Lai Lin, have developed one such project (Lin & Chin, 1998) arising from our initial contact in 1996 and from continuing communications, meetings and sharing of papers since then (for example, Chin & Lin, 1999a; Chin & Lin, 1999b; Leu, 1999; Wu & Lin, 1999). In various papers in this volume, the Taiwanese group has outlined what their aims have become, and the methodology that they have employed to try to answer their questions. We have found many aspects of their project fruitful to think about. However, we wish to highlight one particular aspect of their project that has made us reflect more deeply on our own methods. This aspect concerns the relationship between the members of the research group and the teachers with which they were working.

It seemed that for our Taiwanese colleagues, two teachers in particular responded in different ways because of the background of two of the researchers. One experienced male teacher responded in a more open manner to an interviewer who was more prepared to listen, to learn and to be able to share meanings (Chin & Lin, 1999a; 1999b). This may be a reflection of a Confucian trait in which a more experienced master plays "an active role in directing conversation while the researcher acted as a listener" and learner (Chin & Lin, 1999b, p.317). In a second instance, a woman teacher who had been approached to participate in the project was at first reluctant to do so. She changed her mind after visiting one of the researchers in his office and noticing various artefacts that indicated the researcher was probably a practitioner of Buddhism (Leu, 1999). In subsequent interviews it was noticed how she responded differently to this researcher in comparison to the other researchers. As the interviews developed, it became clear that this teacher's overall life value system was based on Buddhism and was playing a prominent role in her teaching. She believed that one of the crucial aims of her teaching derived directly from these beliefs (Leu, 1999). It was easy for her to make direct links between this system of values she held, and her teaching actions in the classroom. She also felt more at ease discussing such aspects of her teaching with the researcher who also practices Buddhism. One suspects that they used in part a shared language derived from Buddhism in describing why and how she was dealing with values.

In the 'classical' western situation that some researchers have aimed for, there is supposed to be a notion of 'sameness' operating from one interview situation to the next. This means that with appropriate protocols devised and followed, the results from all interviews can be combined because there is an assurance that the situations from which they were derived do not greatly influence the results differentially. In these instances from Taiwan, the interview situations turned out to be clearly different, and the differences did influence the responses of the teachers. It seems highly inappropriate to dismiss the results of these interviews because of the situations described, and indeed our Taiwanese colleagues do not dismiss these data. However to recognize these differing aspects of the situations, and to include them as part of the data reporting, seems to be essential. In these two cases it is clear that the intended curriculum was influenced in different ways to conform to some degree to each of the teacher's personal value set. These teachers held their personal beliefs so highly that they pervaded their acts of teaching and their self-perceptions as teachers.

Our Taiwanese colleagues seem to have used the fact that some of the teachers responded

differently with particular researchers. They have recognized the special type of interactions that grew up and exploited them to gain a deeper insight into the consistency over time of the values that these teachers portrayed in their classrooms.

### *Reflections on the Taiwanese approach*

In the Australian situation, we had intended to pair researchers and teacher participants on a basis of time convenience. However the Taiwanese experience has prompted us to think again. If there is a 'relationship' of some kind between the teacher and one of our researchers, then perhaps we should consider exploiting this. It so happens that some of the researchers and teachers have indeed known each other for a long time. Because of this, it may be that a teacher will feel more at ease discussing values with a friend, than someone they have only recently met. It was noted earlier in this paper that we have already found that for some teachers the word 'values' contains the notion of right and wrong, and of judgement, coming no doubt from the common usage of the word 'value' in our society. This emphasis on 'judging' may lessen if the teacher and researcher know each other and a certain trust between them is already present.

However in following this line, there is a cost as our Taiwanese colleagues have pointed out. We noted in an earlier section of this paper the difficulties already encountered concerning the lack of a shared vocabulary between researchers and teachers. This is likely to diminish if the researcher and teacher know each other. However, another difficulty may take its place. Because there is a shared vocabulary, the teacher and researcher may not feel the need to explore to the same depth their understanding of a classroom episode, as other pairs of teachers and researchers in the project might need to. This is because the pair that know each other may feel that the other will understand fully 'what they are getting at'. We need to guard against this. As well, reflection on past, shared experiences will need to be interrogated carefully since it again is so easy to assume the other will fully understand linkages made between such experiences and a classroom episode.

This approach emphasizes one aspect of this project that we have been conscious of from the beginning. We have always seen the importance of giving the teachers who become part of this project a clear voice. Hence in discussing the observed values in their classrooms during the interviews after the observations, we will be aiming for a consensual view of what happened. We recognise that their perspectives are as important as those of the observer. At one stage of planning this project, we had hopes of recruiting at least two teachers from each school that wished to participate. We thought in this manner the increased amount of discussion to make sense of what was happening in the classrooms would not only enhanced our joint understanding, but the teachers would also feel more empowered within the project. We also thought that it would be good to invite all the teachers participating in the project to one or more focus group sessions to compare and contrast their experiences. So far logistical considerations have prevented both of these aspects of the project being implemented.

In considering the Taiwanese project, it has emphasized again for us how both projects are no longer in the traditional, empirical, objective mould of research. We as the researchers are quite clearly part of the classroom situation, and hence can no longer conceive of ourselves as observers looking in from outside. We are also not studying the teacher as an object, or their teaching as an act quite divorced from broader cultural, social, and political milieu, in which it occurs. Indeed in many ways we would be under utilising a wonderful resource if we tried to do so. Most of the teachers we are working with are well informed concerning research methods, and to some extent the education research literatures. Some

have directed research projects themselves. Hence not to ask them to ‘fully participate’ would be silly. We will need to show in the way we report on this project, this different stance to how we are conceiving of educational research.

## Conclusions

In this paper attention has been drawn to the importance of methodology in researching values. Some approaches, which give insights into these ideas, have been offered. However difficulties still remain such as the development of a shared language. The influence of culture has also been highlighted, both at the societal and personal level. It may be better not to try and wash away such effects with methodological approaches, but recognize them as legitimate and look within them to gain greater insight into how values are taught.

## References

- Bishop, A.J. (1988). *Mathematical enculturation: A cultural perspective on mathematics education*. Dordrecht, The Netherlands: Kluwer.
- Bishop, A. J. (1999). Mathematics teaching and values education: An intersection in need of research. *Zentralblatt fuer Didaktik der Mathematik*, 31(1), 1-4.
- Bishop, A., FitzSimons, G., Seah, W. T., & Clarkson, P. (1999). *Values in mathematics education: Making values teaching explicit in the mathematics classroom*. Proceedings of the AARE-NZARE Conference, [Online]. Australian Association for Research in Education Inc. Available: [<http://www.swin.edu.au/aare/99pap/bis99188.htm>] [2000, April 4].
- Bishop, A.J., Clarkson, P., FitzSimons, G., & Seah, W.T. (2000). ‘Why study values in mathematics teaching: Contextualising the VAMP project?’ In this volume.
- Chin, C., & Lin, F. L. (1999a). Interpreting mathematics teachers' pedagogical values. In F.-L. Lin (Ed.), *Proceedings of the 1999 International Conference on Mathematics Teacher Education* (Vol. 1, pp. 326-331). Taipei, Republic of China: National Taiwan Normal University.
- Chin, C., & Lin, F. L. (1999b). One mathematics teacher's pedagogical values: Intended, implemented, and self phases. In F. L. Lin (Ed.), *Proceedings of the 1999 International Conference on Mathematics Teacher Education* (Vol. 1, pp. 315-325). Taipei, Republic of China: National Taiwan Normal University.
- FitzSimons, G., Seah, W. T., Bishop, A., & Clarkson, P. (2000). ‘Conceptions of values and mathematics education held by Australian primary teachers: Preliminary findings from VAMP’. In this volume.
- Leu, Y. C. (1999). The influences of Buddhism on an elementary mathematics teacher's professional development. In F. L. Lin (Ed.), *Proceedings of the 1999 International Conference on Mathematics Teacher Education* (Vol. 1, pp. 332-353). Taipei, Republic of China: National Taiwan Normal University.
- Lin, F. L., & Chin, C. (1998). *Study on values in mathematics education in Taiwan* : Unpublished manuscript, National Taiwan Normal University and National Tsing Hua University, Taiwan.
- McLeod, D. B. (1992). Research on affect in mathematics education: A reconceptualisation. In D. A. Grouws (Ed.), *Handbook of research on mathematics teaching and learning*. (pp. 575-596). Reston, VA: National Council of Teachers of Mathematics.
- Neuman, W. L. (1997). *Social research methods: Qualitative and quantitative approaches*. (3rd ed.). Boston, MA: Allyn & Bacon.
- Southwell, B. (1995, July 7-10). *Towards a theoretical framework for research in beliefs and values in mathematics education*. Paper presented at the annual conference of the Mathematics Education Research Group of Australasia, Darwin, Northern Territory University.
- Thompson, A. G. (1992). Teachers' beliefs and conceptions: A synthesis of the research. In D. A. Grouws (Ed.), *Handbook of research on mathematics teaching and learning* (pp. 127-146). New York: Macmillan.
- Tirta Gondoseputro, T. (1999). The cross-cultural perspective of teachers' beliefs and their influence on teaching practices: A case study of two teachers teaching secondary mathematics in Australia and Indonesia. In J. M. Truran & K. M. Truran (Eds.), *Making the difference* (pp. 494-501). Sydney: Mathematics Education Research Group of Australasia Incorporated.
- Wu, C. J., & Lin, F. L. (1999). From dynamic interview to reflective constructing: On review studies of values in mathematics education. In F. L. Lin (Ed.), *Proceedings of the 1999 International Conference on Mathematics Teacher Education* (Vol. 1, pp. 420-438). Taipei, Republic of China: National Taiwan Normal University.

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