

Understandings of the Implications of the Treaty of Waitangi in Mathematics Programs

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A New Zealand Professional Standard for beginning primary school teachers states that they will “understand the implications of the Treaty of Waitangi and te reo me ōna tikanga⁴”. This paper presents how this standard was demonstrated by a group of teachers within their mathematics programs. Dilemmas, supports, perceived effects on children’s attitudes and achievement, and implications for pre-service education are presented. Findings include that teachers felt constrained by time, school planning, school culture, and children’s lack of prior knowledge.

Ahakoā he iti, he pounamu.
Although it is small, it is precious.

Regulated Professional Standards were introduced for Aotearoa/New Zealand primary school teachers in 1998 and from the beginning of 1999 the appropriate Professional Standards were to be integrated within each teacher's performance expectations and development objectives. Pay progression on the base scale is subject to the employer, in practice often the school principal, attesting annually that the teacher has met all of the Professional Standards at the appropriate level (Ministry of Education, 1998a). This study investigated the understandings, expectations, supports, and dilemmas of a small group of beginning teachers as they attempted to meet the Professional Standard relating to implications of the Treaty of Waitangi.

The Treaty of Waitangi (referred to hereafter as the Treaty) formalized the relationship formed between Māori and the British Crown. The Treaty promised partnership and equity for the co-signatories. There is continuing debate as to the implications and relevance of the Treaty principles to modern New Zealand society. A variety of teachers’ opinions about their moral and ethical responsibilities in this regard are likely to exist. The Professional Standard explored in this study states that teachers will “understand the implications of the Treaty of Waitangi and te reo me ōna tikanga” (Ministry of Education, 1998b). The research questions of the study were:

How do graduating and first year teachers demonstrate their understanding of the ‘implications of the Treaty of Waitangi and te reo me ōna tikanga’ in their mathematics program?

⁴ Te reo me ōna tikanga as used in the Professional Standard and this paper can be roughly translated as (Māori) language and custom.

What were initial expectations of three teachers in their first year of teaching and what are their hopes for their second year of teaching regarding the implications of the Treaty for their mathematics programs?

What supports, challenges and dilemmas were encountered as they attempt to fulfil their obligations / responsibilities towards the Treaty within their mathematics program?

Theoretical Perspective

The work of beginning teachers is affected by a complex combination of influences such as the content of their pre-service teacher and other education, their beliefs, and attitudes to that content, the community, and culture of the school they work in, and their professional confidence as novice teachers. Therefore the theoretical framework for this study draws from a wide range of areas relating to these influences.

This research builds on a study reported at MERGA in 2003 (Averill & Te Maro, 2003) regarding bicultural perspectives in a pre-service mathematics education program within which relevant theoretical perspectives of the importance of, and practical strategies for, reflecting Māori culture and language within mathematics programs can be found. The three teachers interviewed in this study were within the student cohort which took part in the 2003 research.

Wilson (2002) sees the inclusion of the Professional Standard of this study as a manifestation of the need to “work in a way that might secure a positive and honourable future for the children of [New Zealand]” (p. 40) through an effective understanding of the Treaty. He discusses the lack of both confidence and direction for beginning teachers translating their understanding and knowledge of the Treaty into their teaching practice and provides a framework informed by Bishop and Graham (1997) for such implementation. The framework is based on the principles of partnership, protection, and participation each of which is linked to one of the three Articles of the Treaty of Waitangi. Wilson develops each of these further in the school context. He defines partnership to include consulting with Māori and valuing their input, protection as including acknowledging and promoting Māori language and custom, and participation to encompass ensuring accessibility for the Māori community and that Māori children achieve success.

Thompson (1992) outlines how teachers’ knowledge and beliefs of mathematics affected their conceptions of how it should be presented. The assertion of the difficulty of making distinctions between teacher beliefs and knowledge and the discussion of ways in which teachers might communicate unintended messages and meanings to their students is particularly relevant to this study.

School culture has been defined as ‘the way we do things around here’ (Stoll & Fink, 1996) as it implies the underlying values and beliefs as what counts towards good learning and teaching. Stoll and Fink argue that school culture has a significant influence on the degree of teacher risk taking and experimentation which is needed in order to improve classroom practice and raise student achievement. Beginning teachers are likely to be particularly affected in this regard as they have limited in-depth experience of other schools for comparison and being new to the profession they are involved in risk taking and experimental teaching situations much more often than experienced teachers. Milne (2002) discusses the differences between schools’ professed and actual values and beliefs stating that schools can easily develop policy and mission statements regarding the Treaty but that such statements are “readily recorded but seldom enacted” (p. 43).

How teachers address Treaty principles and related bicultural issues in their classrooms in Aotearoa/New Zealand is under-researched and this study hopes to provide insights to inform further investigation.

Methodology

Theorists promoting narrative inquiry argue that the process of telling and retelling stories of participants' lived experiences encourages greater dialogue and reflection. Presentation of such stories allows others to contribute to the dialogue so that the ultimate act of evaluation will be shared (Bishop, 1996; Clandinin, 1998; Clandinin & Connelly, 1994). This study uses a sequence of semi-structured, in-depth interviews which has the potential to maximise reciprocity through negotiation and construction of meaning (Bishop & Glynn, 1999).

The study data is from interviews with three beginning teachers in the last month of their first year of teaching. Four beginning teachers were selected who had shown particular interest and expertise in te reo Māori me ona tikanga in their pre-service work and therefore in the researchers' opinions were amongst the graduates most likely to have addressed the Professional Standard in their mathematics programs. Consideration was also given to ensuring the selected teachers' schools represented a range of both decile rating and percentage of Māori students. Of the four approached, three were interviewed in the last month of their first year of teaching. The teachers were given the interview questions prior to the interviews which were recorded and transcribed.

The interview sample consisted of one female teacher of Māori descent (teaching at a low socio-economic, 100% Māori roll, Kura Kaupapa Māori⁵ school) one male teacher of European descent (teaching at a high socio-economic, <10% Māori roll, state primary school), and one female teacher of European descent (teaching at a high socio-economic, <10% Māori roll, state primary school), referred to respectively as A, B and C.

The data was analysed collectively by the researchers through determining the main themes given in the teachers' responses. The researchers then individually checked that the collective analysis fairly represented the data after which the teachers were asked for their feedback on the accuracy of the analysis.

Results and Analysis

Results are presented as follows: teachers' initial expectations; aspects included in programs; challenges, dilemmas and supports; perceived effects on children's achievement and attitudes; teachers' hopes for their second year of teaching; and recommendations for pre-service mathematics education programs. All statements in the results section are in relation to the Professional Standard which is the focus of this study and should not be read in a more general sense.

Recollections of Expectations prior to starting the First Year of Teaching

Initial expectations included aspects relating to pre-service education, their prospective school, teaching program, and students. The teachers reported feeling well prepared by their pre-service teacher education in relation to meeting the Professional Standard in their

⁵ Kura Kaupapa Māori are New Zealand state schools in which the principal language of instruction is te reo Māori and the school curriculum is based on Māori values, philosophies, principles and practices.

mathematics programs. Responses included wanting to trial resources and ideas from pre-service courses, feeling they would be able to “hook kids into” mathematics by using mathematics and te reo together, and that it would be easier than it has turned out to be. Teacher C stated “by the end of the year I wanted my students to be fluent in maths terms with Māori ...just not having Māori as separate, but having it integrated in my maths so it was used everyday”.

Teachers’ expectations of their prospective schools were consistent with Ministry of Education (1999) guidelines, i.e., an open education community reflecting the participation principle (Wilson, 2002), community consultation and analysis of the needs of Māori students in relation to the mathematics program. They all expected peer support. Teachers B and C expressed that they had expected to have more freedom in terms of what and how they would teach and that they had expected that the children would have had more prior knowledge and understanding of te reo Māori me ōna tikanga.

Aspects included in Programs

All of the teachers reported experimenting with ways of including aspects of Māori language and culture in their mathematics programs. They also reported using a variety of pedagogies that reflected their understanding of the Treaty and its implications. The actions and pedagogies outlined in Table 1 reflect the principles of partnership (e.g. use of resource people), protection (e.g. use of patterns from Māori craft), and participation (e.g. encouraging discussion) (Bishop & Graham, 1997; Wilson, 2002). The pedagogies compare favourably with Māori pedagogies as described by Hemara (2000) encouraging involvement and engagement of all students.

Table 1

Actions taken by First Year Teachers in implementing the Treaty

Actions Taken
Use of patterns from Māori craft such as kowhaiwhai, tukutuku, koru
Use of relevant / real contexts, Using te reo for numbers, counting and resources
Use of Māori names for mathematics groups, Games in Māori
Use of Māori terms for specific mathematics terms such as ‘place value’
Use of resource people with strengths and experience in te reo and tikanga Māori
Pedagogies Used
Moving mathematics out of the classroom, making use of the environment
Use of songs/waiata, concrete materials, games and stories, Encouraging discussion

The actions taken by the first year teachers reflect those reported at MERGA in 2003 (Averill & Te Maro), including the use of te reo, incorporating aspects of culture, games, concrete materials, resources, taking mathematics outside the classroom, using stories and the use of relevant and realistic contexts. Teachers A and B made use of a resource person with knowledge of te reo Māori me ōna tikanga.

The actions expressed in Table 1 vary in depth from naming of mathematics groups to pedagogies such as use of concrete materials however all show a commitment to drawing from Māori cultural capital as a means of implementing the Treaty in the teachers’ classrooms.

Teacher A stated that because she was in a Kura Kaupapa Māori “te reo and tikanga had to be used in the classroom, and were used in the classroom. In my first year of teaching I didn’t even think of the implications of the Treaty of Waitangi”. For this teacher these aspects were integral to everyday teaching through the nature of the school rather than being something extra to be added as reflected by teachers B and C.

Challenges, Dilemmas and Supports

All three teachers experienced challenges and dilemmas particularly in relation to the partnership and protection principles. The challenges and dilemmas experienced when attempting to transfer attitudes, knowledge, and skills learned within their pre-service course requirements into their mathematics programs were both school-based and personal in context. All of the teachers indicated that they felt influenced by the existing values and beliefs inherent in their school community in terms of what counts as mathematics and how the Treaty is addressed when attempting to transfer their training. In the case of the Kura Kaupapa Māori the school culture supported use of ideas from the teacher’s pre-service education program. In the other two schools the teachers felt constrained by aspects of the school culture.

B: I think there’s a lot of... fear, uncertainty, other issues that surround the Treaty, you know Māori issues, te reo and tikanga...has an us and them kind of attitude...I think people are threatened by those issues...automatically a level of discomfort just pops up.

School based challenges reported included school expectations of what mathematics is and how it should be taught, the time pressure of the amount of content within school based mathematics planning, limited flexibility by the school in terms of individual mathematics program planning, lack of teaching resources including concrete materials, lack of time to visit other classrooms and resource people, and children’s unfamiliarity with te reo (teachers B and C) or te reo skills which were different to that of the teacher (teacher A).

C: I had to take [the children] right back and actually teach basic pronunciation from the start, so that took a lot of time, so instead of using the names straight away, it took a term for them to be pronouncing them properly.

The personal challenges reported included that all three teachers felt the pressure of keeping up with school requirements prevented them from experimenting further within their classroom programs. Personal dilemmas expressed included feelings that there was lack of open debate in the school about the implications of the Treaty, that although a cultural mix did exist the school did not have a high proportion of Māori students therefore feeling unsure of the relevance of the Treaty to their school, and that their junior status as beginning teachers was a challenge in terms of being able to adapt existing programs.

All three teachers described how they were encouraged in the adaptations they made in their mathematics program by the positive responses of the children. Teacher C felt encouraged by other staff to experiment and take risks, and all expressed that there were supportive resource people within or outside the school, such as advisors, pre-service colleagues, kaumatua (community leaders), and tutor teachers. Also mentioned was the support gained through their pre-service teacher education work. Teacher C stated that “a huge support for me was my notes I had from maths, because I found that maths through the whole three years addressed the Māori issue”.

Although not specifically questioned about the use of Ministry of Education resources, none of the teachers reported use of the Ministry of Education Internet site

(<http://www.tki.org.nz/>), the Numeracy project materials or similar such resources for teachers as supports for meeting this Professional Standard.

Teachers' Perceptions of Children's Achievement and Attitudes

The three teachers reported that they felt there were positive effects on children's attitudes and achievement through their attempts to address this Professional Standard. Particular success was gained through generating interest in Te Ao Māori/the Māori world, through use of concrete materials, and by acknowledging children's culture and experiences. Statements included:

B: I see these [Māori] children start to flourish a little bit... they start off with a big warm smile, they seem to be more confident, they know a little bit more about it because it's coming from their experiences... they start to make connections a little better I think.

Teacher C responded that although she could not pinpoint any specific effects on children's attitudes to mathematics or on their mathematics achievement, aspects of her mathematics program stimulated the children's curiosity. They asked many questions about the different parts of the marae, the tukutuku panels, and Māori values. This in turn led to a literature unit to develop concepts of tikanga culminating in a marae visit. She reported, "I learnt that every little bit we do does make a difference, even if it just sows the seeds." Teacher B however stated a concern that more use of te reo may adversely affect the attitude of some students and teacher A stated "when you try to change small kids' attitudes and thinking, it can be quite chaotic, so sometimes it's best to leave things how they are to get through the day, I'm speaking from a beginning teacher's point of view".

Hopes for the Second Year of Teaching

The teachers' hopes for their second year of teaching included the desire for open and honest debate about the implications for the school of the Treaty and for more community consultation. They wanted to be more pro-active in asking questions about the school's response to the Professional Standard, preparing resources, and making changes to their mathematics program to better reflect personal philosophies (e.g. more mathematics work related to contexts relevant to the children). These hopes relate well to all three of Wilson's (2002) principles and show a growing confidence in their professional standing and ability to effect change at a school level.

Recommendations for Pre-service

The teachers' recommendations for pre-service mathematics education programs support use of a strong cultural emphasis. They included the use of clear guidelines on implications of the Treaty, knowledge of multiculturalism, expectations of bicultural and multicultural perspectives in assignment work, and more observation opportunities of classrooms rich in bicultural perspectives. Resource making opportunities were also suggested as they found little time for this in their first year teaching. Further, teacher B suggested that explorations of school culture be made allowing pre-service teachers opportunities to think about how to address this Professional Standard in the way they felt appropriate and to prepare them for dilemmas they may face, commenting that "the theories are easy to learn, but the practice isn't so easy to implement".

Two of those interviewed wanted lecturers to encourage pre-service teachers to just get on with it and try things out. Teacher C said, "just do it" and teacher A stated, "don't be

shy to try anything - try - if it doesn't work, well at least you tried". This feedback indicates that the teachers have maintained their commitment to addressing Treaty issues in their classrooms in spite of the challenges faced and are encouraging of others to pursue pathways towards this ideal.

Discussion and Conclusion

The findings raise questions about how well this Professional Standard is met by beginning teachers in general. The researchers felt that those interviewed were of the graduates most likely to have the skills, knowledge, predisposition, and commitment to address the Professional Standard and the interviews showed that they were committed to continuing their development in this area in the future. Thompson's statements regarding the importance of teacher knowledge and beliefs (1992) raise the question of how well other beginning teachers less skilled, knowledgeable, and committed would be able to meet the Professional Standard particularly if they face some of the dilemmas identified by this study? Would they have the same determination to further their understandings?

The teachers had felt well prepared to address this Professional Standard in their mathematics program and expected it to be easier than it turned out to be. They were able to use resources from their pre-service courses but reported being limited by lack of time to develop further resources, as well as by the starting points of the children in their classes.

The three teachers did manage to address the Professional Standard albeit to a lesser extent than they had expected and hoped. It is likely that they have under-reported the aspects of their everyday teaching practice relating to this standard in that they may have overlooked teaching pedagogies such as cooperative group work and holistic teaching which they may not have seen as counting towards meeting this standard. Aspects and pedagogies used by the teachers agree favourably with the principles expressed within Wilson's (2002) framework.

All of the interviewees saw implementation of the Professional Standard as a school issue as well as a personal issue despite two of them not having felt their school was providing such leadership. Aspects such as consultation with the community were perceived to be out of the teachers' control. This perspective of the importance of the values and beliefs inherent in school culture in relation to their own practice is consistent with those discussed by Stoll and Fink (1996). There are clear implications for schools in providing collegial support and guidance in terms of meeting this Professional Standard.

Possible implications of inadequate incorporation of components which address this Professional Standard in mathematics programs include students being unaware of such perspectives in mathematics and Māori students perceiving that mathematics is not a subject for them. These may contribute to the continuation of a performance gap on traditional measures between Māori and non-Māori children in mathematics.

This research has implications for equity in mathematics learning and culturally appropriate mathematics curricula. Benefits of this research include informing teacher education of possible strategies and challenges when attempting to meet this Professional Standard thus enabling pre-service teachers to be better prepared for the practical aspects of its implementation. Further benefits include informing the wider mathematics education community, contributing to on-going research and debate about teacher education concerning the Treaty and teaching in Aotearoa / New Zealand, and related international research. Professional growth of the interview participants in relation to their understandings, obligations, and responsibilities towards meeting the Professional Standard is also likely to be an outcome of this research. This research lends credence to the view

that national responses to the development of understandings of how to address the Treaty in mathematics education are important. Such development would help ensure pre-service, beginning and supervising/tutor teachers receive guidance and assistance to incorporate suitable perspectives in their own and school mathematics programs.

This paper focuses on findings from a *mathematics* education study but similar issues are also relevant within other curriculum areas. Questions raised by this study include whether partnerships and increased dialogue between different groups within education such as colleges of education, schools, teachers, Māori and other communities could facilitate understanding of issues related to this Professional Standard. Also worthy of research is whether similar limiting effects exist for teachers attempting to address other Professional Standards.

It is to be hoped that exposing the difficulties and the successes experienced by these teachers may facilitate development of pre-service and school mathematics programs which afford appropriate recognition of the implications of the Treaty and enable teachers to meet the required Professional Standards in a widely collegial way with skill and confidence.

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