

Towards an Indigenous Science Curriculum¹

Elizabeth McKinley
University of Waikato

Abstract

The recent development of a national science curriculum in Māori opened up space to contest whose knowledge and whose ways of knowing are included. This paper outlines the background to the curriculum development work in Aotearoa New Zealand with respect to the indigenous Māori people and science education. Concern is expressed about the fitting of one cultural framework into another and questions are raised about the approach used in the development of the science curriculum. Further research in the area of language, culture and science education is discussed along with how Māori might move forward in the endeavour of developing a curriculum that reflects Māori culture and language.

Curriculum development is inherently a political process (Scott, 1992). Contestation and negotiation constantly occur during the curriculum process with respect to what content to include; which groups are singled out to be addressed in the document (indeed, the act of singling out groups is political in itself); how the document should be written, that is, the implied teaching and learning models; which groups and individuals get an input; at what level of development does that input occur—the list goes on. The contestation and negotiation between various groups and individuals can be very fierce. This political nature occurs with all curriculum documents and is not just associated with groups that are more politically overt in their aspirations. In Aotearoa² New Zealand, Māori³ have been contesting many aspects of curriculum over a long period of time (for example, see Barrington & Beaglehole, 1974; Barrington, 1988). With the writing of curriculum documents in Māori a new space has opened up for contestation.

The purpose of this article is, first, to provide a brief description of how Māori curriculum documents have come about and secondly, to give a brief outline of the process carried out in the production of “Te Tauāki Marautanga Pūtaiao: He Tauira” (Draft National Science Curriculum in Māori; Ministry of Education, 1994). Finally, I will present some of the issues raised during the writing of the document and discuss what needs to be done for Māori to move forward in this endeavour.

The Emergence of Curriculum Policy in Māori

The decision in 1992 to write national curriculum documents in Māori was a landmark in Aotearoa New Zealand educational policy. Never before had any national curriculum statements been written in Māori, not even the syllabus for learning Māori as a language in schools. To date, the government has undertaken the production of three draft statements, namely Te Reo Māori (Māori language), Pūtaiao (Science) and Pangarau (Mathematics), and has recently advertised the contract for Tikanga-ā-iwi (Social Sciences) (Ministry of Education, 1995) with the possibility of more to come. These documents form part of the total curriculum revision that is occurring at this time. The changes include a development of a framework (Ministry of Education, 1993) of what is learned in schools along with curriculum statements for each of the designated learning areas.

All these documents together, both Māori and English versions, form the policy on curriculum in Aotearoa New Zealand and contain what schools are expected to teach. As a result of writing curricula in Māori, the government has shifted its “official stance” on education through the medium of Māori from providing only English documents to now providing documents written in Māori.

At first glance, there are two curious aspects about the development of Māori curriculum documents. First, they have been produced by a National government—a political party not known historically for Māori educational initiatives—and in a political environment where the principles of the “new right” discourse guide our preparation for entry into the twenty-first century. Secondly, as they are written in Māori, they have been designed for Māori immersion and bilingual programmes which account for only 14.7% of all Māori primary school children and 7% of all Māori secondary school students or, alternatively, approximately 2% of the total student population in primary and secondary schools. In numbers, this equates to approximately 13,000 students out of a total number of 124,000 Māori students, of the total of 651,000 students in our primary and secondary schools (Davies & Nicholl, 1993).

When the National Party won the election in October 1990, Dr Lockwood Smith—the new Minister of Education—embarked on developing a national curriculum. The draft national curriculum statement, launched at a Post Primary Teachers’ Association curriculum conference, proposed seven learning areas and an emphasis on English, Mathematics, Science and Technology as core subjects. There was no mention of curricula written in Māori. Despite persistent calls from Māori over many years that curricula should be more responsive to Māori needs, there was also no historical precedents of curricula written in Māori, and no indication that it would occur. Hence, the advertisements in the *The New Zealand Education Gazette* (Ministry of Education, 1992) for the writing of curriculum documents in Māori took many Māori educationalists a little by surprise.

Discourses Contributing to the Emergence of Māori Curriculum Statements

The development of a national science curriculum in Māori has occurred at the intersection of a number of changes in official state discourses surrounding education in the 1980s. It is part of the general politicisation of the concerns associated with general issues of education but in particular, the need for a competitive world economy and Māori rights. This can be seen as a technological discourse concerned with Aotearoa New Zealand’s economic growth and development; a liberal discourse concerned with choice, personal rights, and individual expression; and discourses from Māori associated with the Treaty of Waitangi (McKinley, 1995).

The technological discourse concerning economic growth and development emerged from concerns in most OECD countries about a world wide economic recession and the subsequent emergence of major trading forces. As a result, many countries turned to their education systems as a means of educating a highly skilled workforce in order to compete in the global marketplace. If schools were going to contribute to the economic recovery, their role and what they were doing would need close scrutiny. The major reforms in education administration and in curriculum are seen as a means of changing not only the role of schools, but also what they were teaching. It was important that schools operate to produce students whose knowledge could be put to use in the workforce at the time they leave school. This discourse requires as many of the population as possible working towards productivity, otherwise their talent is wasted. Unemployment statistics are approximately 1 in 5 for Māori compared to 1 in 20 for Pākehā (non Māori of European descent). These figures indicate that not all Māori are contributing to the economic recovery.

Hence, the notion of increased Māori achievement (and by implication, increased employment) appeals to the state.

As a result of the technocratic discourse the government perceived that education, and hence schools, should be more in line with how private enterprise operated. Hence, the public sector reforms came to be based on public choice theory, managerialism and new economics of organisation (Boston, 1991). According to Lauder (1990), this radically altered how education was perceived. Firstly, education was to be seen as a private good and should therefore be paid for by the individual. And secondly, the principle of competition needed to be an integral part of education so that it could become more efficient in matching the skills learned at school and those required by the marketplace. The notion of consumer choice and individual rights paves the way for Māori medium education to be considered legitimate in state policy. At the same time, in making Māori medium education legitimate the government supports its own claims to the legitimacy of the reforms by stating that it has a social justice policy. However, this legitimacy of social justice is very tenuous as it can be interpreted as a policy that puts the “problem” of Māori education back with Māori while the Crown abdicates responsibility with respect to Māori rights in the Treaty of Waitangi.

The official discourses on Māori and education are longstanding. The assimilation policies lasted from the time of settlement until the 1960s when education for Māori was basically aimed at developing particular vocational skills as deficit models were used to explain why Māori could not do academic courses. In the late 1970s and early 1980s, pressure from radical Māori (and feminists), mainly outside education, moved the liberal discourse to one of an emphasis on educational outcomes and, specifically, to the educational achievement of Māori (and women). These were political concerns directed at the structures of education. Increasingly during the 1980s, Māori challenged the hegemony and legitimacy of the state in terms of Māori sovereignty. Bilingual and Māori immersion classes/units/schools, Kāhanga reo (preschool education teaching through the medium of Māori) and kura kaupapa Māori (primary education teaching through the medium of Māori) all emerged as forces in Māori education. Māori demanded recognition for Māori cultural forms—language, customs, and beliefs to be incorporated into the institutions of the country. This was a demand for the recognition of Māori values in the legitimating social norms of education.

As these three discourses intersected what emerged was a policy on curriculum in Māori. The loss of Māori language has been used by Māori educationalists as an argument as to why Māori underachieve in the education system. Smith (1990) relates it to the legitimacy of things Māori in schools and self esteem theory. The policy to write curriculum statements in Māori was seen as a means of addressing Māori concerns over the use of Māori language (and, hence, things Māori) and at the same time giving support to the Māori medium education that was burgeoning around the country. In this way the government has finally recognised that Māori language is part of the solution to Māori educational underachievement.

The Development of Te Tauākī Marautanga Pūtaiao: He Taurira⁵

The development of the Draft National Science Curriculum Statement in Māori (“Te Tauākī Marautanga Pūtaiao: He Taurira”) was done under contract, which is consistent with the policy of a division of labour between “policy decision makers” and “policy implementation” (Boston, 1991), between the University of Waikato and the Ministry of Education. Pauline Waiti and I, both working for the University of Waikato at the time, became the Project Coordinators for the contract. It was important to Pauline and me that we based this development as much as possible in kaupapa Māori (Māori values) (Irwin 1992; Smith, 1990) and that we involved as many Māori

people as possible. Hence, the process model that was finally decided on was a group of writers to write the document, a support group for the coordinators, close contact with Te Taura Whiri i te Reo Māori (the Māori Language Commission) for the language development that would need to occur, and groups formed by our writers in their tribal areas and regions. In addition there would be a more informal process of consultation done by all people involved.

The Writers

The selection of the writing group was done according to criteria we had established. Apart from ensuring the inclusion of primary and secondary teachers, and the range of differently structured schools, such as contributing primary, intermediate, secondary, area and F1-7, we needed to consider other criteria: the ability to speak and write Māori language well (second language learners and native speakers); a sound knowledge of tikanga (cultural forms); knowledge of a scientific discipline(s); representation of broad iwi (tribal) groups from all over the country; and, different types of Māori schooling options (i.e., immersion, kura kaupapa Māori, bilingual). The criteria for choosing a group to write the Māori document arose partly from the known paucity of Māori speakers with respect to subject qualifications, teaching qualifications and previous curriculum experience, and the time limit placed on the development of the document.

The final writing group contained eight women and six men—all were Māori. Of these fourteen people, seven were trained primary teachers, six were secondary trained and one was a kaiārihi reo (a fluent Māori speaker employed in schools to support Māori language programmes). The trained teachers' experience in schools ranged from being a second year teacher to many years of teaching experience. Of the six secondary trained teachers four were science teachers (all women) with degrees in chemistry, zoology, physics and biochemistry and all were second language speakers with varying degrees of language fluency. The other two secondary trained teachers were Māori language teachers—one native speaker and one second language learner. In addition to the kaiārihi reo (a fluent Māori speaker employed in schools to support Māori language programmes), four of the primary trained teachers were also native speakers and three were second language learners. Hence, we had six native speakers in all covering both primary and secondary areas.

Two of the fourteen writers were advisers, two employed at teachers' colleges and one employed on a "second chance" programme in a university. Of the remaining, nine were currently employed in immersion, bilingual and kura kaupapa Māori schooling options, from area, primary, intermediate and secondary schools. One group that was not covered was Māori church schools. The majority of the writers came from the top half of the North Island (11) and the rest from the lower half (3). There was no one from the Taranaki/Wanganui area and no representative from the South Island despite our attempts to recruit such people. This regional/iwi (tribal) spread reflects, to some extent, Māori population distribution and, hence, the places where Māori schooling options appear to be more frequent. However, it also represents at the same time the areas/iwi (tribes) where Māori language has been kept alive as a thriving community language and the places with the most native speakers.

The Advisory/Support Group

The other group that was very important for Pauline and me was our advisory/support group. The professional science educators around us could not speak Māori and, hence, could not read our document and give us feedback. One member of our advisory/support group was a non-Māori speaker but was included on the grounds of having expertise in the field of curriculum

development. The other members of our group included people who could offer us support in tikanga Māori (Māori culture), kura kaupapa Māori (Māori based schools teaching through the medium of Māori), science and immersion teaching. This group became actively involved with our writing hui (meetings), as writers and advisers and in challenging our thoughts. In particular, one of the advisory group acted as our kaumatua (male elder) in matters of Māori protocol, such as welcoming our group, as well as our adviser on related Māori aspects that permeate the document. The people involved in this group offered both personal and professional support to both of us. Often they would come to writing hui (meetings) at very short notice to help guide the group through some of the difficulties we faced, and another regularly came to help with the writing process.

Consultation

Apart from the advisory/support group, each of the writers had a reference group to consult with at the end of each hui and to review the emerging document. These groups were very diverse in their makeup as well as how they operated. One reference group consisted of a small group (4) of teaching colleagues from surrounding schools. Another group consisted of experienced teachers who had been given a year's leave from their respective schools all over the country to do the Bilingual Teaching Certificate under the auspices of the Wellington Teachers' College. Another group was the school whanau that were already meeting on a regular basis. A further reference group was made up of several groups in a region where the curriculum writer travelled to various hui (gatherings) being held throughout the rohe (tribal region) in addition to some meetings of teacher groups. The sharing of reference groups between two writers in the North Island enabled us to set up a group in Christchurch to consult. The members of all these groups were not only teachers involved with science education or teaching, but also parents, grandparents, kaumatua (male elders), kuia (female elders)—in fact, anyone with an interest. They were not all "invited" to be on a group (although people did invite those who they thought could have an input) but many of the groups were treated as being quite open to membership. The writers often took opportunities to talk to various people about the document through other collective social occasions.

In addition to the reference groups, the project coordinators also consulted various groups. These groups were not science education groups (the majority of whom would not be able to read the document). As the Pangarau (Mathematics) and te Reo Māori (Māori language) documents were also being written we were able to combine hui (gatherings) with the developers of those projects. This type of consultation ranged from speaking to Māori teacher groups to hui (gatherings) in marae (tribal meeting houses) in various rohe (tribal regions). The discussion was always wide ranging—many wanted to be informed as to what was happening, while others debated the point of producing these documents, along with all the issues that surrounded the initiatives such as ownership of knowledge, knowledge constructs and language development. The positioning of the community in this development formed an integral part of the process.

Groups Within the Ministry of Education

Within the Ministry a person was employed by the Curriculum Implementation Division to oversee all the curriculum development contracts in Māori—science, mathematics and te reo Māori (Māori language). She did not have any particular expertise in science, although she was fluent in te reo Māori (Māori language). Under new managerialism (see Boston, 1991; McGee & Moltzen, 1993), expertise in science was not required as her job was to manage the various parties

involved with the development—not to contribute to the writing of the document. In addition to managing the whole contract, she was also responsible for putting in place all the accountability mechanisms and choosing those people to be involved with this. The only Ministry group we dealt with was a group called the Policy Review Group. This group was made up of kaumatua (male elders), kuia (female elders), science teachers, Māori advisers and other interested parties. This group was to be kept separate from the writers and coordinators and acted to see if the contractors had met all requirements for each report. After each report was submitted the Review Group fed back information and queries for us to consider at our next hui (meeting).

The Timeframe

On the 15 September, 1992, an advertisement appeared in *The Education Gazette* for anyone interested in developing a science curriculum statement in Māori to register with the Senior Manager at the Ministry of Education. People were invited to register their interest before 30 October by sending in a curriculum vitae, including the names of two referees, and to also include “a statement outlining relevant abilities and experience and how the task of developing the curriculum statement for science in Māori would be approached” (Ministry of Education, 1992, p. 11).

The contract was signed between the Ministry of Education and the University of Waikato, as our employers, on the 8 May 1993. Pauline and I began full time on the contract on the 10 May, 1993. We had six months full time leave to complete the document. Included in the contract were specifications to meet and a time line punctuated by progress reports (called milestones) to the Ministry. Over the six months we were required to meet regularly with Ray Harlow, from Te Taura Whiri i te Reo Māori (the Māori Language Commission), who was appointed to edit the document as it progressed through various stages. This had to be done before we furnished milestone reports to the Ministry. We were also meeting regularly with other representatives of Te Taura Whiri i te Reo Māori (the Māori Language Commission) in Wellington to generate new technical words required for the document.

Although our contract was complete by December 1993, “Te Tauākī Marautanga Pūtaiao: He Taurira” (Draft National Science Curriculum Statement in Māori, Ministry of Education, 1994) was officially launched on national television on 16 October, 1994 (along with the Mathematics and Māori language documents). The documents were pilot tested in 1995 and circulated for submissions. The documents will be finalised in 1996.

The Process of Language Development

The process of developing Māori language for technical terms was the only area where Māori had autonomy of development. Written into the contract with the Ministry was the development of the scientific language needed to write the document. The Māori Language Commission (Te Taura Whiri i te Reo Māori) had been set up in 1987 as a result of the Waitangi Tribunal’s findings that the Māori language had not been protected under the terms of the Treaty of Waitangi. The task of the commission is to initiate, support and develop policy which will give substance to the status of Māori as an official language and, more broadly, to do whatever it sees as appropriate to promote and maintain Māori as a living language (Harlow, 1993). The development of Māori language to express all the scientific concepts needed for the document was a large, but not insurmountable, job.

Although the Ministry did not specifically require us to consult with the Māori Language Commission for technical word development, we did decide to work with them closely. One of

the reasons for doing this was that the Commission was being contracted by the department to edit the document through the development process as well as editing it upon completion. In developing new vocabulary Te Taura Whiri i te Reo Māori (the Māori Language Commission) follow loose guidelines that the word must be short, transparent and not a loan from English. The first two guidelines have linguistic reasons for their implementation but the last is there for completely different reasons. In a time when many languages are making use of an international terminology in scientific and other technical areas, Māori language seems to be avoiding them. Harlow (1993) argues that this position taken by the Taura Whiri i te Reo Māori (the Māori Language Commission) is directly related to the whole enterprise of education in Māori and that is "to preserve the language as a living means of communication entails preserving it in opposition to and distinct from English" (p. 129). In linguistic terms this attitude is called "purism." However, it is only purist with respect to English, because of its strong impact in Aotearoa New Zealand, and loans from other languages are admitted.

The most important aspect here is that the development of "Te Tauākī Marautanga Pūtaiao" (Draft National Science Curriculum Statement in Māori) presented us with an opportunity to develop a systematic approach to developing scientific terminology. In the past, a more ad hoc approach had been taken as new vocabulary was being developed without the wider relationships necessarily being known. As a result of more systematic development, some scientific vocabulary that had been published was changed.

The Developmental Process

The writing group met for four writing weeks over the months of June to November 1993. This consisted of two 4 day meetings and two 5 day meetings. Towards the end of the contract, time was running out, smaller one day meetings were scheduled between the coordinators and one or two of the writers. Most of these smaller meetings could be described as "tidying up" the document and resulted from the fact that neither of the project coordinators had enough fluency in Māori to be able to write the document well.

The debates and issues raised over the course of the writing were wide ranging. Many of them rose from the restrictions placed on the contract by the Ministry and from the lack of debate at this level among Māori. Also we did not have the luxury of time for reflection on many of the issues. Even given more time, it is very debatable that more satisfactory resolutions could have been met. The issues that were raised included: who was the document for; the rationale of the document; language; the nature of knowledge; and ownership of knowledge. All of these issues can be related to the socio-historical position of Māori in New Zealand and the level of negotiation at which we entered the writing of the curriculum. It is these issues to which I wish to turn now and their wider implications for both Māori and policy decision makers.

Issues Needing Further Debate⁶

Who is the document for?

The very first issue brought up by group members and which had to be sorted out before we could go any further, was one that would affect the whole document. The debate about who the document is for is to do with Māori schooling options and their differences (see Jenkins with Ka'ai, 1994; McKinley, 1995; for a discussion of these). Currently, the education system offers a range of options in Māori education. Broadly, these include mainstream schools, bilingual units

or schools, immersion units or schools, and kura kaupapa Māori (Māori based schools teaching through the medium of Māori). The decision was made that this document is for all students learning through the medium of Māori (which leaves out mainstream schools that teach in English only). In essence, anyone who can read the document has access to what it contains.

This question was not dealt with in the English version because it was assumed that the document is for everyone. In fact, it was raised, but only with respect to what “ability grouping” the document would be written for. The “Science for All” statement found in the English version is to draw attention to specific groups that, in the past, have not benefited as much from science education as other groups—the “disadvantaged” groups. Māori form one of those groups in an English version but when writing a Māori version that sort of reasoning renders itself redundant. (This is not to say there are some groups within the group Māori that could be seen as being “disadvantaged” under the same definition. However, this has little to do with ethnicity which is what the statement in the English version is based on.) The debate about who the document is for is to do with Māori schooling options and their differences (for a discussion of these, see Jenkins with Ka’ai, 1994; McKinley, 1995).

A major implication arising from this question regards the position of national curricula in Aotearoa New Zealand. This is an area that has rarely (if ever) been contested. The reasons often given for having a national curriculum have usually centred around our small population (about three and a half million) and a highly mobile population. However, as Māori discourses have emerged over the last twenty years that have resulted in alternative schooling for Māori children, our comfort with a national curricula is being unsettled. The call for a different curriculum is mainly coming from kura kaupapa (Māori based schools teaching through the medium of Māori) but, in some ways, they are being supported by iwi (tribes) who are developing education plans of their own. These calls are based on the assumption that previous curricula have not catered for the needs of Māori. This questioning does not necessarily imply that the idea of a national curriculum needs to be disposed of altogether. However, it does imply that a national curriculum needs to be continually and critically reviewed. The current structure, and the conditions that this one was carried out under, position Māori and Pākehā (non-Māori of European descent) as opposing interest groups. Although this has served various interests in the past I am not convinced it will be very productive for the future for the reasons discussed at the end of the paper.

Language

Another issue that arose during the production was that of language. There was no formal debate on whose language would be used (that is, the dialect) but language debates did come up in other ways. The first was concerned with the differences in syntax construction between the native speakers and second language learners of Māori. The implications are quite large when considered in context. The decision was made (very easily) that the document must be written so it can be understood by those who were going to use it, namely teachers. However, most of the teachers teaching through the medium of Māori are second language speakers (due to previous government policy in Māori education). This immediately raised another question - how much should this document contribute to the upskilling of our second language learner teachers in schools (assuming that native speaker status is the pinnacle of second language learning)?

The other debate concerning language was the role of Te Taura Whiri i te Reo Māori (the Māori Language Commission). The Māori Language Commission is a government funded agency whose role is to develop the Māori language. Many Māori perceive Te Taura Whiri i te Reo Māori (the Māori Language Commission) with some scepticism. This results from the very political topic of language regularity or standardisation which is simmering in wider Māori circles. As ‘Māori’

is made up of various tribal groups with differing dialects, any move to standardise the Māori language is treated with some contempt by various Māori groups. With our own group concerned with writing the curriculum, we addressed this by inviting Te Taura Whiri i te Reo Māori (the Māori Language Commission) to speak to the writers and talk about their role with our project. People accepted the role and so the issue retreated. It is an issue that needs to be sorted out among the Māori community.

Rationale of the Document

This is a difficult debate and one, I suspect, that will rage for a very long time with varying intensity. It is also one that many people have spent their lives on and libraries are written about it. It became clear early on in the hui that the writing group wanted the document to be firmly grounded in Te Ao Māori (the Māori world). The decision made was to include whakatauki (proverb), tauparapara (incantation), pakiwaitara (legend), pūrakau (myth), waiata (song) and whakapapa (genealogy) in the document because of their importance to Te Ao Māori, and that the document would open with a tauparapara as it was seen as a way of linking the past with the present and the future. The tauparapara is also a means of indicating to everyone that Te Ao Māori is made up of both Te Ao Wairua (spiritual world) and Te Ao Kikokiko (physical world) and that the two are inextricably bound. Hence, in trying to ground the document in Māori values we were laying the ground for the knowledge debates that followed. We need a lot more debate about what we want our children to learn in a Māori science curriculum and how this can be carried out. The document has created a space for this to happen.

The Nature and Ownership of Knowledge

The issues concerning the nature and ownership of knowledge are always very difficult to resolve. However, in Aotearoa New Zealand among Māori, there are some quite clear reasons as to why they arise. Many Māori have seen “ownership of knowledge” as a power issue. This comes from two sources—first, there are some cultural reasons for this in the notion of knowledge for specific peoples, and secondly, it has been seen that Pākehā (non Māori of European descent) in positions of “power” have achieved it through the knowledge they held. However, entwined with this is the notion that schooling contributes to this reproduction. Māori are very aware of the reproductive role of schooling—part of why we teach science is to reproduce the assumptions on which science as a subject is based. Another reason as to why Māori question this is because of previous experiences we have had with giving knowledge to others and then finding it reinterpreted in some book with someone else’s name on it. This is well documented (by a number of peoples all over the world) and far too complex to enter into a debate here. It is suffice to say that Māori are very well aware of these issues.

The issues revolving around the nature and ownership of knowledge were raised mostly in the first two hui. At the first hui debates centred around the notion of “Māori science” and how this might differ from “western science,” and what that might mean for the document we were trying to produce. World views and relationships and responsibilities between “he tangata” (people) and “te taiao” (the world) formed the basis of the initial discussions. These debates became much more focussed during the second hui when we were looking at the nature of the strands. There was an overwhelming agreement that the strands needed to be different from the English version—that the strands should somehow encapsulate a Māori view of “taiao.” This proved to be one of the biggest stumbling blocks of the project. A lot of discussion centred around what Māori concepts were going to form the basis of the strands that would also incorporate the

“knowledge” already defined in the English version of the document. As this caused difficulty the group came to the conclusion that even though we could discuss this more we basically had to get on and do some translation—we were going to run out of time. What these discussions represent is not only the difficulty of putting knowledge forms together but also much of the discussion with respect to curriculum that needs to occur for Māori versions if they are to develop further than what is currently being done.

One of the things that did eventuate was the taking of the strand “Making Sense of the Planet Earth and Beyond” (see Ministry of Education, 1993a) and spreading it across the other three strands of the document. Some people reading this article may see this as a retrograde step as the English version of the document could be said to represent a break-through for Earth Science in that it becomes as important (in terms of time spent on it) as the more “traditional” view of science being biology, chemistry and physics. Much of the Planet Earth and Beyond strand, in the Māori version, has gone into the “Biological World” strand, which was renamed ... Mataora. What is important for Māori is that this represents the joining of Papatūānuku (earth) with the rest of “living things” (as defined through science). Other than this change, much of the strands are the same. The astronomy objective from the “Planet Earth and Beyond” strand has gone into the “Physical World” (ŌAhup Ūngao) strand.

Although debates on knowledge have been going on for some time now (in Māori circles at least), they have not been that well focused in the past. The writing of these documents have, despite their shortcomings, focused our attention on what we really mean by “Māori knowledge” and when it is appropriate to use that knowledge. The notion of Māori knowledge, used relatively non-specifically by Māori in the past, must be re-evaluated as a strategy. Further to this, what this might mean for curricula and how might we turn this into curriculum structure and content. We may even find that it is not a good long term solution.

Where Do We Go From Here?

Māori science education has two very broad facets to it which are interrelated and interactive in their production. First, there is a role in educating people on making science work for Māori. This aspect needs to include all New Zealanders—in English and Māori—and needs to cover a range of ideas from how science affects Māori people (as individuals and as a societal group) to getting our concerns on the science research agenda. The second facet involves the idea of empowering Māori to become genuine participants in the production of scientific knowledge. If we hold on to a national science curriculum, then it must be inclusive of Māori aims and aspirations. With a science curriculum in Māori, we have partially achieved the aspirations with respect to language.

The concept of a curriculum that is capable of being inclusive of the needs of Māori represents a challenge to the basis on which all previous educational curricula have been developed. Inherent in this concept is the unsettling of the idea that there can ever be one true form of knowledge that is best for everyone to learn. Gilbert (1993), in her work in feminism and science education, states that the arguments for the development of a genuinely inclusive curriculum are based on two assumptions. Firstly, that all previous curricula have only ever represented a partial view of the range of all possible knowledge, and secondly that this partiality has had an effect of disadvantaging and alienating certain social groups by not making accessible to them the particular forms of knowledge that originate in the culture of that group. Such assumptions are very much part of Māori educational researchers’ arguments for a curriculum that meets the needs of Māori (Smith, 1990; McKinley, Waiti, & Bell, 1992; Jenkins with Ka’ai, 1994).

Although these assumptions are contentious, at the same time they raise some very important issues that need to be thought through and debated if Māori are to move forward in the curriculum debate. Gilbert (1993) further argues that the notion of group knowledge, such as Māori knowledge, needs very careful consideration before it is used and, if it is used, it should only be used on a temporary basis. She argues that this debate will lead back to the notion of knowledge(s) of particular groups becoming residualised, that is, the optional extra that gets put in after the main agendas have been realised. For Māori, this would be no further forward than we are today.

If we, as a country, are going to keep a national curriculum then it needs to be inclusive of the needs of Māori. Given that, then careful thought is needed about the criteria which we develop to assess the usefulness and/or validity of different forms of knowledge to be included in that curriculum. Knowledge in the curriculum needs to be relevant for a wide range of people in different situations at different times. At the same time it needs to be non-alienating for the wide range of students and produce a sound foundation for the development of new knowledge(s) and for its critical evaluation. In order to do this, it needs to be recognised that the criteria will never be able to be fixed permanently and there must be an expectation that the criteria will always be subject to contestation. The process of negotiating the content of a curriculum is always political (Scott, 1992).

Notes

1. This paper forms part of an MEd thesis. For a fuller analysis of the development of “Te Tauākī Marautanga Pūtaiao: He Taurā” (Draft National Science Curriculum in Māori) see McKinley (1995) in the references. See also *SAMEpapers 1995* (Hamilton, New Zealand: Centre for Science, Mathematics and Technology Education, University of Waikato).
2. A Māori name for New Zealand
3. Māori are indigenous peoples of Aotearoa New Zealand.
4. The curriculum is parallel to the English version and covers general science in schools from 5-18 year olds.
5. The following sections of this paper give the details relating to the process of setting up the groups required to get the document written and also with writing the document itself. It has been suggested that this section is too detailed. The purpose of the detail is to give the reader some indication of the issues that needed to be considered and dealt with in the preparation stages of writing a science curriculum in Māori. These issues are not always spoken or written about in science education as they are often considered not to be part of the field. However, the positioning of some groups in society makes it so that issues not normally related to the science education field have to be dealt with in association with and simultaneous to the field. The positioning of Māori, as people and as language, in Aotearoa New Zealand makes the dealing with the following issues inevitable and hence they must be given credibility as part of the science education field. I have also deliberately kept the paper quite specific. I personally become very wary when people try to generalise statements or even make suggestions about how other peoples can be “helped”—I leave that to the reader.
6. It was suggested that readers would want to see something of the curriculum document in this article. This is extremely difficult to do when the document is in another language—particularly a language that shares very few linguistic characteristics with English. I have in this section tried to give some flavour but it is impossible to give the detail that some reviewers would like to see.

Correspondence: Elizabeth McKinley, CSMTER, University of Waikato, Private Bag 3105, Hamilton, New Zealand.
Internet email: mckinley@waikato.ac.nz

References

- Barrington, J. M. (1988). Learning the dignity of labour: Secondary education policy for Māoris. *New Zealand Journal of Educational Studies*, 23(1), 45-58.
- Barrington, J. M., & Beaglehole, T. H. (1974). *Māori schools in a changing society: A historical view*. Wellington: New Zealand Council for Educational Research.
- Boston, J. (1991). The theoretical underpinnings of public sector restructuring in New Zealand. In J. Boston, J. Martin, J. Pallot, & P. Walsh (Eds.), *Reshaping the State: New Zealand's bureaucratic revolution*. Auckland: Oxford University Press.
- Davies, L., & Nicholl, K. (1993). *Māori in education*. Wellington: Learning Media.
- Gilbert, J. (1993). *Feminism/science education*. Hamilton, New Zealand: Centre for Science, Mathematics and Technology Education Research, University of Waikato.
- Harlow, R. (1993). *A science and mathematics terminology for Māori. SAMEpapers 1993*. Hamilton, New Zealand: Centre for Science, Mathematics and Technology Education Research, University of Waikato.
- Irwin, K. (1992, November). *Māori research methods and processes: An exploration and discussion*. Paper presented at the New Zealand Association for Research in Education and Australian Association for Research in Education Conference, Deakin University, Geelong, Australia.
- Jenkins, K., with Ka'ai, T. (1994). Māori education: A cultural experience and dilemma for the state: A new direction for Māori society. In E. Coxon, K. Jenkins, J. Marshall, & L. Massey (Eds.), *The politics of learning and teaching in Aotearoa-New Zealand*. Palmerston North: The Dunmore Press.
- Lauder, H. (1990). The new right revolution and education in New Zealand. In S. Middleton, J. Codd, & A. Jones (Eds.), *New Zealand education policy today: Critical perspectives*. Wellington: Allen & Unwin.
- McGee, C., & Moltzen, R. (1993). Principles underlying the reforms. In D. Mitchell with C. McGee, R. Moltzen, & D. Oliver (Eds.), *Hear Our Voices* (Final Report of Monitoring Today's Schools Research Project). Hamilton: University of Waikato.
- McKinley, E., Waiti, P., & Bell, B. (1992). Language, culture and science education. *International Journal of Science Education*, 14(5), 579 - 595.
- McKinley, E. (1995). *A power/knowledge nexus: Writing a science curriculum in Māori*. Unpublished Master of Education thesis, University of Waikato, New Zealand.
- Ministry of Education (1992). Contract positions. *The New Zealand Educational Gazette*, 15 September, 11.
- Ministry of Education (1993). *The New Zealand curriculum framework*. Wellington: Learning Media.
- Ministry of Education (1993a). *Science in the New Zealand curriculum*. Wellington: Learning Media.
- Ministry of Education (1994). *Te tauākī marautanga pūtaiao: He tauira*. Wellington: Learning Media.
- Ministry of Education (1995). *The New Zealand Educational Gazette*, 74(1), 19.

- Scott, J. W. (1992). Campus communities beyond consensus. In P. Aufderheide (Ed.), *Beyond PC: Towards a politics of understanding*. Saint Paul: Graywolf Press.
- Smith, G. H. (1990). Taha Māori: Pākehā capture. In J. Codd, R. Harker, & R. Nash (Eds), *Political issues in New Zealand education* (2nd ed.). Palmerston North: The Dunmore Press.