

Opinion Page

Opinion: *The Defence of Science and the Status of Māori Knowledge*

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On the whole, science is one of the most successful human endeavours. But it is not without its sceptics and critics who would weaken, and even reject, both the claims and methods of science and its technological applications. The noise of the anti-vaccers, the climate-change deniers, the footpath lichen eaters, and the ‘alternative fact’ claimants are impossible to ignore – ask those dealing with the return of measles in New Zealand. In a recent article in the New York Times on the measles epidemic in the United States and the rise of anti-vaccination sentiment, a prominent expert on infectious diseases is quoted as saying: “Science has become just another voice in the

room. It has lost its platform. Now, you simply declare your own truth.” [1]. If this is so, then science has lost all authority as a system of knowledge and as a way of getting it. So, anything goes!

On a larger scale there have been the science deniers who adopt competing world views such as one of the various religions, a mystical world view or one of the many different, often incompatible, ethnic traditions to be found in the world. In this essay we wish to consider one example of the last of these which is prominent in New Zealand, Mātauranga Māori. This is often translated as ‘Māori knowledge’ and we will go along with this; but alternatives might be ‘Māori lore’ or ‘Māori belief systems’ (the last is particularly apt especially if one wishes to avoid the implication that talk of *knowing that* must always involve *truth*).

The growing effort to incorporate Mātauranga Māori into New Zealand science policy and education is in line with a world-wide movement toward “indigenisation.” Here, we examine the relations between science and Mātauranga Māori, and conclude that while Mātauranga Māori has much to offer in terms of culture and values, it also subverts those aspects of science—namely objectivity, universality, and dedication to progress—that can further advance the understanding of nature and help find solutions to the major problems afflicting the planet. At a time when acceptance and understanding of science are at a low ebb, indigenisation of science can only weaken its effectiveness, to the detriment of all, including indigenous cultures.

Here we wish to provide a critical evaluation of the relationship between science and Mātauranga Māori. Most scientists do not consider this, either because they are too busy getting on with the job of doing science or it is not part of their background

training to consider such issues. But it is important to defend the values of science, its authority through the means of rational discussion, and the methods it employs in objective inquiry. We are fully aware that science must continually justify itself. We also know that science, or more strictly its applications, have been used to do harm—to individuals, to society, to the planet. But we also know that the applications of science have done enormous good.

Important here is the distinction between the methods of science and the purposes for which it is used; between how science is ‘done’ and what it is used for. Our aim is to put a stake in the ground in defence of science’s methods. We ask that these methods be seen as separate from the purposes to which science’s discoveries and technologies are put (but this is not to say that science has nothing to say about these matters, such as Bayesian decision theory). Those purposes are ethical, political, and social and should be publicly debated. The methods of science however belong to science.

Blurring the Boundaries

In recent decades there has been a blurring of the boundaries between science and folk knowledge throughout the world. This is unsurprising because the two types of “knowledge” can overlap. In New Zealand Mātauranga Māori is the body of knowledge encompassing the traditional Māori way of viewing the world. This is broadly encompassing as “the knowledge, comprehension or understanding of everything visible and invisible in the world” (Hikuroa, 2017, p. 6).

As such Mātauranga Māori may well come into conflict with not only science as it has developed

but also other religions and rival ethnic world views. However, it is also evident that it can include knowledge which has been scientifically established in order to solve problems. This may also be the case with other folk belief systems throughout the world.

Since science emerged from folk and traditional knowledge through the application of criticism and of scientific methods it is inevitable that some similarities will remain; so why is the blurring of boundaries a problem? Surely recognising traditional knowledge can only support justice for those indigenous peoples today who campaign for their knowledge to be recognised as somehow on a par with science and included in the teaching and practice of science, including the university curriculum? From Irish, and Catalan, to Māori, Sami, and indigenous American, there is a call in many parts of the world for traditional knowledge and values to be incorporated alongside science’s universal understandings.

This call also talks of respect for the balance between humans and the natural world, saying that indigenous peoples have maintained that balance with care for the environment embodied in their traditional knowledge. In New Zealand, this is used to justify the recognition of Mātauranga Māori as at least on a par with science in informing science and its practices.

Mātauranga Māori in Relation to Science

Given the increasing recognition of folk knowledge world-wide and the strength of that recognition in New Zealand’s science organisations it’s timely to ask: How does Mātauranga Māori relate to science? This question is especially pertinent given the Mātauranga Māori’s decade-long

connection to science in the government's Vision Mātauranga policy. Since its inception in 2005, the policy's overall aim is "to unlock the innovation potential of Māori knowledge, resources and people to assist New Zealanders to create a better future" (Ministry of Research, Science and Technology, 2007, p. 2). It is to be achieved by fostering connections between Māori, government, the science system and industry and by providing support for the development of iwi-led research and development strategies.

Vision Mātauranga is now deeply embedded in New Zealand's research institutions. The Ministry of Business, Innovation and Employment includes Mātauranga Māori in its investment priority areas as do Crown Research Institutes. Researchers seeking funding, for example to the Royal Society Marsden Fund, must state how they will include Mātauranga Māori in their research.

It is true that society's interests are central to judging the purposes of science and the uses to which it is put. The current measles epidemic is a timely reminder of our interest in the MMR vaccine and herd immunity. However, the methods of science are accountable to science itself. The MMR vaccine, along with the process of vaccination itself (as far back to Jenner and Pasteur, if not before), was largely developed in accordance with scientific methods not according to folk knowledge about the disease.

Hikuroa (2017) builds on several decades of publications justifying an alleged "equivalence" of traditional knowledge and science. He explains the nature of Mātauranga Māori and deplores the way it has been disregarded and neglected by the science community as "myth and legend, fantastic and implausible" (p. 5). Such writings and the Ministry's *Vision Mātauranga* make a case for the

creative potential of Māori knowledge and ways of thinking, and urge that it be incorporated into the mainstream of science and business.

But the Royal Society article and *Vision Mātauranga* also note that science differs from Mātauranga Māori, notably with respect to methods. We agree with the article's comment that the methods are what makes a significant difference: "While there are many similarities between Mātauranga Māori and science, it is important that the tools of one are not used to analyse and understand the foundations of another" (Hikuroa, 2017, p. 9)

This is a major difference and raises serious questions as to whether the two "knowledge" types should be considered to be "equivalent", whatever "equivalent" means here, and how this might be achieved. But this idea is problematic. Consider some claim, such as "The Earth orbits the Sun". One may come to hold this on the basis of a séance, or a matter of faith, or because some Holy Book says so, or because it is society's traditional belief, and so on. But none of these provides the kind of evidence on the basis of which Copernicus and Galileo came to make this claim.

What this illustrates is that two people might hold the same belief but quite different pathways have led to it; some scientific some not. Clearly this does not make for equivalence of belief systems. As illustrated, there is a lack of equivalence founded in the different method that was employed by Copernicus and others to arrive at his claim. In the light of this, science and Mātauranga Māori cannot in any good sense be regarded as equivalent as bodies of belief; the difference lies in the method and evidence used to justify the belief.

Similarities

The similarities between science and traditional knowledge derive from their shared origins. This has long been understood and leads to some similarities in purpose, method, and objects of inquiry. A fundamental shared purpose arises from the human need to understand the natural and social world and, as a result, to control and manage its people and resources.

Both knowledge types also can have some similarity of method. Traditional knowledge and/or belief makes assumptions and inferences, a practice also found in the hypotheses used in science. Here we can tentatively advance the claim that our ancestors might have developed cognitive abilities involving the use of proto-rules of investigation that led to proto-science. (We leave it to science to tell us whether this is so or not.)

Even granting this, it is an approach which can lead us to “false starts” such as the Greek idea of ‘humours’ in medicine. In fact, the history of science shows us that “false starts” were the norm and these had to be criticised before science was to advance. Scientifically incorrect conceptual models, such as in astronomy and alchemy along with many other theories such as racial superiority, have traditional origins, but have been shown to have no foundation.

Science and folk knowledge also study many of the same subjects. Indeed, the mainstays of folk knowledge world-wide are about botanical, navigational, medical and geographical knowledge. This knowledge continues to provide insights for science and shows the value of a relationship between the two types of knowledge. What the nature of this relationship is, however, needs considerable discussion.

Differences: Change and Challenge

It is only in looking closely at the differences between folk knowledge and science that we are able to enter into a meaningful discussion about how they relate. The impetus behind the relentless advance of science is unceasing doubt and challenge. The philosopher Karl Popper, at one time resident in New Zealand, made a proposal along the lines that any scientific theory must be open to potential falsification. If the theory cannot possibly be proven wrong, it is not scientific. But this requirement, one that makes science ‘science’, can also be a destabilising force. That our cherished theories of science are open to being shown false challenges the authority of tradition, the very tradition which authorises the way things are—‘culture’ in other words. Science overturns the past while traditional knowledge tends to valorise it.

Hikuroa (2017, p.6) refers to the method of whakapapa, the “cognitive genealogical framework” of Mātauranga Māori that connects ideas of today to those of the ancestors. He contentiously maintains, among other things, that “[In] Māori cosmogony, because there is only one set of primal parents (Ranginui and Papatūānuku, from whom everything ultimately traces descent), all things are related.” (ibid., p. 6). Though much within Mātauranga Maori can survive within science and with a scientific basis, this claim is highly unlikely to do so.

Ongoing links with the past provide stability by *not* doubting—by linking the cultural knowledge, beliefs, and practices of today to their history. This cultural cement binds individuals to the group and the group to the ancestors. It gives traditional knowledge its mana and status. In a period of indigenous cultural revival the value of traditional

knowledge is jealously guarded. This can lead to disagreement about who may use the knowledge, how it can be used, and to whom researchers are accountable.

A different attitude to truth was clearly illustrated by the Moriori incident at New Zealand's national museum in 1999 (Munz, 2000). Four History professors took Te Papa to task for the omission in its Moriori exhibition of all references to the 1835 conquest of the Chatham Island by 'mainland' Māori and massacre of a great portion of the traditional Melanesian-Moriiori population who had been living there since, probably, the 1500s. The professors accused the museum of misrepresentation and suppressing the truth.

The dispute shows different forms of accountability and authority. An acknowledged Mātauranga Māori expert and a key figure in the *Vision Mātauranga* policy provided a clear demonstration of the difference in his defence of the exhibition: "People who do not understand Mātauranga Māori may have difficulty in understanding there are many different standards of truth. Since relations between Maori Te Ati Awa and Moriiori remain contentious more light is shed by the omission of certain events than by their inclusion" (quoted by Munz, 2000, p.13). He added that the Museum was justified in suppressing the truth about the massacre because it "accepts the inherent value of Mātauranga Māori". The Director of Te Papa Museum added that "it was racist to reveal truths which show the Maori invaders in a bad light (p. 13)." This approach to truth could not be tolerated in science nor in any serious social science.

The histories of all nations, ethnic groups, religions, political movements and institutions are punctuated with awkward, if not plainly out-

rageous, episodes that most acknowledge, regret and try to learn from. It is not in anyone's interest to deny or cover-up these episodes. The 'do not offend' approach to Māori history taken by the National Museum is no more justified than some German, French, Polish approaches to holocaust history. Or Chinese Communist Party approaches to Cultural Revolution or Tiananmen Square history. Or countless other histories where a shade is lowered over embarrassing historical episodes.

Is Mātauranga Māori 'science' or is it a distinctive Māori world view? If the knowledge is 'science' then it is accountable to the various scientific disciplines. If it is traditional knowledge, then it is accountable to iwi (Māori groupings) authority. Hikuroa (2017) does identify this contradiction but doesn't seem to see it as one, saying instead that mātauranga Māori "does include knowledge generated using techniques consistent with the scientific method but explained according to a Māori world view" (p. 5).

This attempt to evade the inconsistency is not acceptable. The techniques or methods he refers to are universal ones. If Mātauranga Māori were to be subjected to the criticism and disciplinary authority of peer review, as in the sciences, it ceases to be traditional knowledge and becomes science—available to all scientists including those from different cultural backgrounds, and importantly, available for challenge and change.

Broughton and McBreen (2015) also address relations between mātauranga Māori and science, but reach a somewhat different conclusion:

Although there will be opportunities to work together, that is not the goal of revitalising mātauranga. The goal is not partnership; it is tino rangatiratanga and instituting mātauranga as a primary and independent knowledge system. Fu-

ture relationships will be between equals (p. 86).

If indeed mātauranga Māori is after all distinct and independent enterprise, there seems little justification in imposing it on scientific research and teaching.

Differences: Objective Knowledge

Scientific disciplines are built around originating ideas which change as they are put to the test. The best-known idea that has changed dramatically as a result of challenge is the idea that the sun went round the earth changing to the earth going round the sun (the traditional Māori view was not Copernican). Science is replete with examples of how well-established views, or core fundamental hypotheses, came to be rejected and replaced by novel and more powerful ideas in the course of the development of science. (We leave the reader to pick their own favourite examples.) Unlike traditional beliefs they are not fixed to the particular environment within which they were first developed. And this is to be expected given the critical function of scientific methods applied to every science itself. This is why science is universal in its practice and universal in its truth-claims.

You may not be the scientist who first thought of, say, radio waves or the first who identified how they could be used, but you can certainly think about radio waves. You can observe the physical properties that the idea represents and how the idea can be used in technology. The use of electricity in lighting, heating and power is a good example of this while the idea of neuronal discharge is used in understanding how the senses work, and even in how the imagination works. Ideas such as cognitive dissonance have a role in understanding how beliefs are established. And what's more, you

don't have to be of the same social group as the first scientist. You may live in a different time, in a different place, belong to a different gender, race, or religion. The idea doesn't care about your social status. The scientific claim, contention or idea, is an object—available to all universally.

Conclusion

Vision Mātauranga has been operating in our universities and research institutions for over a decade, a state of affairs justified by the perceived “equivalence” between the two types of knowledge. A current advertisement for a lecturer in Zoology at Otago University shows how accepted the inclusion of Mātauranga Māori has become. The advertisement speaks of *advancing Mātauranga Māori/Te Ao Māori perspectives in the study of Zoology with the position affording an exciting opportunity for an emerging scholar to research and teach from a kaupapa Māori perspective*. What does this mean? Does it mean the inclusion of folk knowledge? If so, with what consequences? In New Zealand, is time to discuss these questions.

Our contribution has been to point out the similarities between science and mātauranga Māori, but we have also identified differences that are significant. We would encourage a role for Māori to bring something of their rich knowledge and traditions into science; but insist that the science so informed be done by the usual standards and methods. The extent and implication of these differences suggest that the relationship between science and mātauranga Māori be re-considered. At the very least, the matter should be discussed publicly. Comparable discussions can profitably occur in many countries where similar indigenisation education and policy programmes are supported.

In an age where trust in science has weakened we need ways to restore that trust. Recognising science's distinctiveness and power is a starting point.

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