

Mātauranga Māori: a philosophy from Aotearoa

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Abstract

This paper responds to an earlier one about mātauranga Māori by Dan Hikuroa (2017), in a spirit of koha (contribution) towards keeping alive this important discussion about the relationship between science and Māori knowledge. Mātauranga Māori (Māori knowledge) has been discussed for many years in the fields of Education and Māori Studies, and more recently has been taken seriously as a policy issue by the science establishment in Aotearoa New Zealand. I argue against equating mātauranga Māori with science, since I think it is better conceived as a form of philosophy of science, rather than as a form of ‘science’ itself. This approach possibly allows ideas from mātauranga Māori to inform science at a values level, below the level of the empirical knowledge base, without needing to claim that mātauranga Māori is the same as science or uses scientific methods.

Keywords

Māori philosophy, Mātauranga Māori, Nature of science, Philosophy of science

Introduction

This paper responds to an earlier one by Dan Hikuroa (2017) titled *Mātauranga Māori – the ūkaipō of knowledge in New Zealand*. This title image is worth expanding further: the literal meaning of ‘ūkaipō’ refers to night feeding a baby. The word ‘ūkaipō’ also has deeper metaphorical and philosophical layers of meaning, in reference to human life and its dependence on Papatūānuku, the Earth Mother. Hikuroa’s title therefore casts a rich image of nurturing the growth of environmental and scientific knowledge in Aotearoa New Zealand, and a sense of mātauranga Māori (henceforth: ‘mātauranga’) as the original or ‘infant body’ of knowledge generated in, by and for this country.

Hikuroa describes mātauranga as developing after the arrival of Māori ancestors in Aotearoa, pictured as the “pursuit and application of knowledge and understanding of Te Taiao” [the environment or natural world] (p. 5). “Mātauranga Māori is therefore a method for generating knowledge, and all of the knowledge generated according to that method” (p. 6). He lists eight Māori oral genres: mōteatea, whaikōrero, maramataka, waiata, pepeha, whakataukī/whakatauāki, whakapapa, and pūrākau, and proceeds to explain and give examples of how some of these genres or forms of mātauranga are “generated using the scientific method, explained according to a Māori world view” (p. 6). On this basis, Hikuroa states that mātauranga can “be considered as science” (p. 9). His final sentence, however, nuances this claim when it states that mātauranga is “scientific in part, [and] extends the history of scientific endeavour back to when Māori arrived in Aotearoa” (p. 9).

I want to rehearse some of these interesting and valuable ideas from my own perspective in Māori science education. To base the curriculum on mātauranga has been part of the rationale behind developing *Te Marautanga o Aotearoa*, the national Māori-medium school curriculum (Stewart, Trinick, & Dale, 2017). Consequently, Pūtaiao (Science) has grappled with the relationship between science knowledge and mātauranga in the classroom programme (McKinley & Keegan, 2008; McKinley, McPherson Waiti, & Bell, 1992). The two main approaches have been: either teaching mātauranga instead of science; or translating the entire science programme (and lexicon) into te reo Māori. The translation approach dominates, but both approaches are self-defeating: if the aim is to produce Māori scientists, then students must learn enough science at school to get into university science education, which learning mātauranga will not achieve. But neither will translating science into te reo, which denies students access to the international ‘anglicised’ language of science (Ammon, 2001). The translation approach also causes deeper problems by creating neologistic forms of te reo, in the process setting Māori words adrift from Māori thought.

Taken too far, either approach—teaching mātauranga instead of science, or translating science into Māori—hinders rather than helps Māori students to achieve in science (Stewart, 2011, 2017). These insights arise from teaching, not practising, science and mātauranga: school teaching involves representing knowledge in the curriculum, and translating knowledge into forms that help children to learn. But the pedagogical demands of Māori science education heighten the tensions in the knowledge debate, and throw into relief the incommensurabilities between the knowledges, languages and philosophies of science and mātauranga.

The next sections focus in on this relationship between mātauranga and science, and the effects of the ‘invisible’ philosophy of science. My points suggest possible benefits in regarding mātauranga as *different* from science, which leads the discussion in another direction from that of Hikuroa (2017).

Conceptions of ‘science’

Like other large knowledge concepts, such as art, philosophy or religion, science is notoriously difficult to succinctly and adequately define (Chalmers, 2013). The nature of science is a matter of ongoing debate in disciplinary philosophy (Brown et al., 2012) and in science education (Osborne, 2014). Working scientists are seldom concerned with defining the nature of science, and other philosophical problems of knowledge (Williams, 2001) that are generally of no consequence in their work. Scientists work in their disciplines but seldom have opportunities to study the philosophy of science, which is considered part of philosophy, as distinct from science itself.

Science as a knowledge tradition draws on a vast intellectual history, as old as humanity itself, but science, as it operates in today’s world, refers to a particular form of knowledge system, with a specific history and set of characteristics, which has advanced inexorably to its current status of unprecedented power and complexity. Despite its short, singular name, ‘science’ is a heterogeneous, **dynamic** system of knowledge, with its central disciplines of biology, chemistry, physics and mathematics continually evolving and expanding in all directions into many interdisciplinary fields. **As a human form of knowledge, science continues to develop and change with ongoing technological and philosophical progress.**

Science is often characterised by listing its cognitive values or describing its methods, but contemporary philosophy of science accepts as “questionable” the assumption that science has an essential nature (Okasha, 2016, p. 15). Not only has science **changed and** developed alongside humanity throughout the ages and cultures, but the idea of science has also been used and abused in creating science myths and ideologies: distortions of science, often used for political purposes, sometimes referred to as scientism (Sorell, 1991). The difficulty of clearly demarcating the boundaries of science, combined with its powerful position at the top of the hierarchies of knowledge, mean that claims to science status must be carefully evaluated.

Science has been an object of study for many decades in history and philosophy (Stinner & Williams, 1998), and more recently also in sociology, anthropology and cultural studies (Latour, 1999; Nader, 1996; Roth & Tobin, 2006). The word ‘science’ stems from the Latin word for ‘knowledge’ in general, and according to one definition, any coherent body of knowledge can be considered a science (Snively & Corsiglia, 2001). The nature of human thought has been an ongoing topic of interest in anthropology, with longstanding debates comparing science against other cultural forms of knowledge (Wilson, 1970). In cultural studies, a form of knowledge about nature that enables a culture to survive is referred to as a ‘science’ or ‘ethnoscience’ (Stewart, 2015), but in a different sense from how ‘science’ is understood in the school science curriculum (Aikenhead & Michell, 2011).

All cultural knowledges or ethnosciences involve knowledge of nature, collect evidence using the human senses, and use logical thinking to process experience and guide decision-making. In this sense, mātauranga counts as a science. But such general descriptors do not justify the claim that all cultural knowledge bases are therefore ‘the same’ as contemporary science knowledge. Science education and public science research funding are two key contexts where the claim of science status for mātauranga has material consequences. The nexus between equity, funding, and Māori perspectives in these contexts ensures the question of mātauranga as science remains politically sensitive. A previous short communication (Broughton & McBreen, 2015) argues that mātauranga must be state funded on ethical grounds because it forms part of Māori political rights.

Debate on the relationship between science and mātauranga has revolved around the yes-no question: Can mātauranga be regarded as science, or not? Some authors, including Hikuroa (2017), argue that mātauranga *is* science (Lomax, 1996; Stewart-Harawira, 2005; Wood & Lewthwaite, 2008) while others argue it is *not* science (Dickison, 1994; Gluckman, 2011; Matthews, 1995; Nola & Irzik, 2005). But this seemingly simple question is ambivalent for several reasons: the difficulty of demarcating science’s boundaries, and the tendency to make ‘honorific’ claims to science status (Sorell, 1991); the non-standardised nature of mātauranga; and the influence of politics. Discussions of Māori interests and mātauranga can easily become confused. Equally good reasons can be listed for and against both answers, yes or no. The ‘slippage’ in its terms means that what appears to be a simple question is actually a philosophical conundrum, for which a ‘hard’ or scientifically ‘correct’ answer cannot be found.

An invisible philosophy

According to contemporary understandings of philosophy of science, science knowledge is composed of both its empirical knowledge base and its paradigm or theoretical framework, both underpinned by a set of philosophical commitments. As noted above, a working scientist is seldom aware of the philosophy of science, which is thus rendered invisible, but still exerts influence. Science has been the dominant knowledge tradition for several centuries in 'Western' thought and culture, yet scientists generally react badly to any critique of science, as shown by the 'science wars' (Ross, 1996). Intolerance of criticism betrays lack of understanding that science, as Western philosophy, "cannot get to its own ontology through its rational method. It is barred, as it were, from looking at itself" (Mika & Peters, 2015, p. 1126). If science claims to be 'factual' and free from values, then how can it make claims about its own value? This 'dilemma' (Mika & Peters, 2015) is systemic or philosophical within science, and also conducive to the 'personal blindspots' displayed by many scientists, such as buying in to triumphal narratives of science, or raising alarm about the 'danger' of so-called 'anti-science'. All this debate is encapsulated in what I call the 'invisible' philosophy of science.

Lack of attention to the philosophy of science can easily lead to invalid comparisons between science and other forms of knowledge, including mātauranga. The existence of systematic empirical Māori knowledge of natural phenomena as part of mātauranga is undisputed, but is insufficient, on its own, to justify equating mātauranga with science, because mātauranga and science have different philosophies or frameworks of knowledge. Another invalid comparison is the tendency to compare the 'facts' of science with the 'values' of mātauranga. The 'value' of mātauranga is enshrined in policy (Ministry of Business Innovation & Employment, 2019), but most interpretations see mātauranga as a 'resource' for science, an approach that has been described as a form of knowledge colonisation or 'epistemic violence' (Spivak, 2006). In resisting the appropriation of mātauranga by science, Broughton and McBreen (2015) argue that comparisons between mātauranga and science are irrelevant, since mātauranga forms part of Māori rights, so warrants state funding on ethical grounds.

To equate mātauranga with science means attributing to mātauranga the epistemological commitments of science, thereby limiting the ability to explore and develop contemporary understandings of mātauranga in its own right. Mātauranga as a form of indigenous knowledge

is widely claimed to be valuable for science, yet most scholarship takes up one of the positions described in the previous paragraph, each of which has limitations. The relationship between science and mātauranga is linked to the relationship between English and te reo Māori, which have also co-existed in Aotearoa New Zealand since the arrival of Pākehā (the British settlers); indeed, mātauranga could be considered the philosophy of te reo. Bilingualism in general is shown to confer cognitive advantages to an individual, and these advantages are related to the access of the bilingual individual to two different cultural knowledge systems (Gilbert, Hipkins, & Cooper, 2005), which echoes the Māori experience of ‘living in two worlds.’ This reasoning points to the benefits of considering how mātauranga is *different* from science. The academic debates between mātauranga and science have been largely ‘language independent’ i.e. as if mātauranga means the same in translation into English as it does in its original form. Further discussions of these links between knowledge and language are beyond the scope of this paper, but worth pursuing in relation to the role of mātauranga in the science system of Aotearoa New Zealand.

The gift of being different

While mātauranga includes empirical knowledge of the natural environment, it does not share the same paradigm or theoretical framework as science. Rather, the traditional Māori cosmogenic and nature narratives taken together make up the paradigm and philosophy of mātauranga, within which Māori empirical knowledge is organised and makes sense (Stewart, 2019). Mātauranga shares with science an interest in **understanding** natural phenomena, but does not share the same theoretical base. Mātauranga is underpinned by a different philosophy of knowledge **from that of** science (Royal, 2003; Salmond, 1978). This suggests it might be more helpful to compare the *philosophy* of science with that of mātauranga. In such an undertaking, the real value of mātauranga lies in its differences from science. The aim of making careful comparisons between science and mātauranga, each on their own terms, is to better understand these productive differences, and what they can do.

It makes more sense to relate mātauranga to a Māori form of philosophy, rather than chasing after the status claim of ‘Māori science’. To compare mātauranga with the philosophy of science, rather than with science itself, lessens the emphasis on empirical knowledge and scientific methods, and pays more attention to frameworks of values and ethical concepts. **The meaning of the term ‘Māori science’ is more political than epistemic**: it acts as a provocation

of the assumed meaning of ‘science’ as a Western form of knowledge, in recognising that the term ‘Western science’ is as problematic as ‘Māori science’ (Stewart, 2007). To examine the relationship between mātauranga and science shines a light on the ‘invisible’ philosophy of science. In this sense, mātauranga acts as a mirror for science: a way for Western knowledge to see beyond its blinkers, to gain more understanding of itself and its own limitations.

Conclusion: Let’s keep talking

Mātauranga takes its place on the research stage in Aotearoa New Zealand, included in public science funding through the policy *Vision Mātauranga* (Ministry of Business Innovation & Employment, 2018). There are endless possibilities for mātauranga and science to work together on practical projects (Mark, Chamberlain, & Boulton, 2017). Understood as philosophy, mātauranga can potentially help in finding a way out of the “dilemma of Western philosophy” (Mika & Peters, 2015, p. 1125).

Public science funding and the Māori-medium school curriculum are two real-world contexts in which the question of the relationship between science and mātauranga is important, but these two domains have little contact and do not work together. There are many levels, from philosophy to politics, and everything in between, at which to consider the relationship between mātauranga and science. These are urgent considerations, given the current attention being given in national policy contexts to mātauranga: for example, it is a focus area of the 2019 PBRF Review (Ministry of Education, 2018). Better understanding of this relationship is needed to improve our ability to respond to national and global problems, and increase Māori participation in research and academic institutions in Aotearoa New Zealand. A more connected conversation amongst all those concerned would be a good way to start.

References

- Aikenhead, G., & Michell, H. (2011). *Bridging cultures: Indigenous and scientific ways of knowing nature*. Don Mills, Ontario: Pearson Education.
- Ammon, U. (Ed.). (2001). *The dominance of English as a language of science*. Berlin and New York: Mouton de Gruyter.
- Broughton, D., & McBreen, K. (2015). Mātauranga Māori, tino rangatiratanga and the future of New Zealand science. *Journal of the Royal Society of New Zealand*, 45(2), 83-88. <https://doi.org/10.1080/03036758.2015.1011171>

- Brown, J. R., Carrier, M., Snyder, L. J., Richardson, A., Psillos, S., Kusch, M., . . . Curd, M. (2012). *Philosophy of Science: The Key Thinkers*. London, United Kingdom: Bloomsbury Publishing. Retrieved from <http://ebookcentral.proquest.com/lib/aut/detail.action?docID=1744041>
- Chalmers, A. F. (2013). *What is this thing called science?* (4th ed.). London, UK: Open University Press.
- Dickison, M. (1994). Māori science? Can traditional Māori knowledge be considered scientific? *New Zealand science monthly*, 5(4), 6-7.
- Gilbert, J., Hipkins, R., & Cooper, G. (2005). Faction or fiction: Using narrative pedagogy in school science education. Retrieved from <https://www.nzcer.org.nz/research/publications/faction-or-fiction-using-narrative-pedagogy-school-science-education>
- Gluckman, P. (2011). *Looking Ahead: Science Education for the Twenty-First Century. A report from the Prime Minister's Chief Science Advisor*. Auckland: Office of the Prime Minister's Science Advisory Committee. Retrieved from <http://www.pmcsa.org.nz/wp-content/uploads/Looking-ahead-Science-education-for-the-twenty-first-century.pdf>.
- Hikuroa, D. (2017). Mātauranga Māori—the ūkaipō of knowledge in New Zealand. *Journal of the Royal Society of New Zealand*, 47(1), 5-10.
- Latour, B. (1999). *Pandora's hope: essays on the reality of science studies*. Cambridge MA: Harvard University Press.
- Lomax, T. (1996). Māori science revisited. *NZ Science Monthly*, 7(6), 12-13.
- Mark, G., Chamberlain, K., & Boulton, A. (2017). Acknowledging the Māori cultural values and beliefs embedded in rongoā Māori healing. *International Journal of Indigenous Health*, 12(1), 75-92. <https://doi.org/10.18357/ijih121201716902>
- Matthews, M. (1995). *Challenging NZ Science Education*. Palmerston North: Dunmore Press.
- McKinley, E., & Keegan, P. (2008). Curriculum and Language in Aotearoa: From Science to Pūtaiao *L1- Educational Studies in Language and Literature*, 8(1), 135-147.
- McKinley, E., McPherson Waiti, P., & Bell, B. (1992). Language, Culture and Science Education. *International Journal of Science Education*, 14(5), 579 - 595.
- Mika, C., & Peters, M. (2015). Blind, or Keenly Self-regarding? The dilemma of Western philosophy. *Educational Philosophy and Theory*, 47(11), 1125-1127. <https://doi.org/10.1080/00131857.2014.991496>
- Ministry of Business Innovation & Employment. (2018). *Vision Mātauranga*. Retrieved from <https://www.mbie.govt.nz/science-and-technology/science-and-innovation/agencies-policies-and-budget-initiatives/vision-matauranga-policy/>
- Ministry of Business Innovation & Employment. (2019). *New Zealand Research Information System*. Retrieved from <https://www.mbie.govt.nz/science-and-technology/science-and-innovation/research-and-data/nzris/>
- Ministry of Education. (2018). *Terms of Reference: Review of the Performance-based Research Fund (PBRF) 2019*. Retrieved from <https://www.education.govt.nz/further-education/policies-and-strategies/review-of-the-performance-based-research-fund/>
- Nader, L. (Ed.). (1996). *Naked Science: Anthropological Inquiry into Boundaries, Power and Knowledge*. New York & London: Routledge.
- Nola, R., & Irzik, G. (2005). *Philosophy, science, education and culture*. Dordrecht, The Netherlands: Springer.
- Okasha, S. (2016). *Philosophy of science: a very short introduction* (2nd ed.). Oxford, United Kingdom: Oxford University Press.

- Osborne, J. (2014). Teaching scientific practices: meeting the challenge of change. *Journal of Science Teacher Education*, 25(2), 177-196. <https://doi.org/10.1007/s10972-014-9384-1>
- Ross, A. (Ed.). (1996). *Science Wars*. Durham NC: Duke University Press.
- Roth, W.-M., & Tobin, K. (2006). Editorial: Announcing cultural studies of science education. *Cultural Studies of Science Education*, 1(1), 1-5.
- Royal, T. A. C. (Ed.). (2003). *The Woven Universe: selected writings of Rev. Māori Marsden: The Estate of Rev. Māori Marsden*.
- Salmond, A. (1978). Te ao tawhito: A semantic approach to the traditional Māori cosmos. *Journal of the Polynesian Society*, 87(1), 5-28.
- Snively, G., & Corsiglia, J. (2001). Discovering Indigenous Science: Implications for Science Education. *Science Education*, 85(1), 6-34.
- Sorell, T. (1991). *Scientism: Philosophy and the infatuation with science*. London and New York: Routledge.
- Spivak, G. (2006). Can the Subaltern speak? In B. Ashcroft, G. Griffiths, & H. Tiffin (Eds.), *The Post-Colonial Studies Reader* (2nd ed., pp. 28-37). New York, NY: Routledge.
- Stewart-Harawira, M. (2005). *The new imperial order: indigenous responses to globalization*. London and New York: Zed/Huia.
- Stewart, G. (2007). *Kaupapa Māori science [Unpublished doctoral dissertation]*. University of Waikato, Hamilton, New Zealand. Retrieved from <https://hdl.handle.net/10289/2598>
- Stewart, G. (2011). Science in the Māori-medium curriculum: Assessment of policy outcomes in Pūtaiao education. *Educational Philosophy and Theory*, 43(7), 724-741. <https://doi.org/10.1111/j.1469-5812.2009.00557.x>
- Stewart, G. (2015). Ethnoscience. In R. Gunstone (Ed.), *Encyclopedia of science education* (pp. 401-402). Dordrecht Heidelberg New York London: Springer. Retrieved from https://link.springer.com/referenceworkentry/10.1007/978-94-007-6165-0_362-6. <https://doi.org/10.1007/978-94-007-2150-0>
- Stewart, G. (2017). A Māori crisis in science education? *New Zealand Journal of Teachers' Work*, 14(1), 21-39.
- Stewart, G. (2019). Mātauranga and Pūtaiao: the question of 'Māori science'. *New Zealand Science Review*, 75(4), 65-68.
- Stewart, G., Trinick, T., & Dale, H. (2017). Te Marautanga o Aotearoa: History of a national Māori curriculum. *Curriculum Matters*, 13, 8-20. <https://doi.org/https://doi.org/10.18296/cm.0018>
- Stinner, A., & Williams, H. (1998). History and philosophy of science in the science curriculum. In B. J. Fraser & K. G. Tobin (Eds.), *International Handbook of Science Education* (Vol. 2, pp. 1027-1045). Dordrecht: Kluwer Academic Publishers.
- Williams, M. (2001). *Problems of knowledge: A critical introduction to epistemology*. Oxford and New York: Oxford University Press.
- Wilson, B. R. (Ed.). (1970). *Rationality*. Oxford: Basil Blackwell.
- Wood, A., & Lewthwaite, B. (2008). Māori science education in Aotearoa-New Zealand: He pūtea whakarawe: Aspirations and realities. *Culture Studies of Science Education*, 3, 625-662. <https://doi.org/10.1007/s11422-008-9089-x>