
Working theories

Current understandings and future directions

Helen Hedges

Working theories form an overarching learning outcome interdependent with learning dispositions in *Te Whāriki*. Working theories encompass children's embodied, communicative, and social efforts to learn, think, and develop knowledge that enables children to participate effectively in their families, communities, and cultures. To support children's learning and participation, kaiako are expected to engage with children's working theories in respectful, reciprocal, and responsive interactions. This article brings together current understandings about working theories to support kaiako knowledge and practice.

Introduction

Young children are interested in and curious about their lives and worlds from birth. Curiosity and inquiry are what motivates children to engage in theorising. *Working theories* originated as an innovative holistic outcome in *Te Whāriki*, the Aotearoa New Zealand early childhood curriculum (Ministry of Education, 1996, 2017). The term reflects ways children generate ideas about their lives and worlds through theorising.

Working theories incorporate all of children's embodied, linguistic, cognitive, communicative, participatory, and social efforts to learn. Working theories therefore have connections with thinking and knowledge development, but developing accurate ideas and knowledge is not necessarily an aim. In contrast, theories frequently persist in the face of conflicting evidence when children attempt to meld, or resist, new information and experiences alongside their prior theories and understandings. In *Te Whāriki*, kaiako are expected to engage with and support children's working theorising in respectful, reciprocal, and responsive interactions.

This article brings together current literature about working theories in five sections. The first overviews selected scholarly work where ideas about children as theorists originated. The next part presents research that has worked on defining and theorising working theories. The

third section provides examples of working theories from research undertaken with children, kaiako, and families. The fourth section describes kaiako understanding of the concept of working theories and connections with curriculum design, and the final part provides specific examples of pedagogical strategies and responses. Naturally, many articles also address material in other sections. Most literature is understandably from New Zealand; international literature is more recent but growing as exploring children's cognitive development and intellectual curiosity are matters of global interest. The article concludes with ideas for future practice-based research about working theories.

Children as theorists: Early scholarly literature

The idea of children as theorists was present in the work of Annette Karmiloff-Smith (1988) and Alison Gopnik and Andrew Meltzoff (1998). For these psychologists, babies were born with the cognitive ability to theorise, and theory formation described the process undertaken of learning and knowledge building. Karmiloff-Smith explained that theories have explanatory, predictive, and problem-solving powers, and are constantly in flux. She noted that, while young children are spontaneous theorists, even once verbal they can rarely articulate those theories. Karmiloff-Smith proposed that the reason children continue to hold theories

in the face of contrary evidence is because they are not yet linking their theories into coherent concepts. Gopnik and Meltzoff suggested that childhood theories were likely to have the same structural, functional, and dynamic features as those of scientists. Children were described as active learners, and attention was drawn to children's abilities as scientific theory builders.

However, these cognitive–constructivist approaches tended to view children's age, immaturity, and lack of life experience from a deficit perspective, leading to notions of naïve theories and misconceptions as explanations for children's theories. As *Te Whāriki* promotes an image of children as confident and capable learners, these ideas do not have a natural fit with adopting a strengths-based approach to children's capabilities.

Other work has more potential to align with a positive, holistic, and multimodal stance on children's learning capabilities. The 1993 draft of *Te Whāriki* had theoretical footnotes that attributed the concept of working theories to Guy Claxton's (1990) constructivist notion of minitheories. Claxton suggested that much knowledge is intuitive and theory like. People develop different, piecemeal, fit-for-purpose minitheories used to interpret new information. Over time, minitheories become more effective, comprehensive, and appropriate, and eventually connected. Theory development is lifelong and not confined to childhood.

Jerome Bruner (1960) argued that intuition is a valid and important intellectual skill. He suggested that young children need plenty of personal experience of concepts in their lives, and to understand them intuitively before they can be taught subjects such as science and maths more formally. Bruner's work with Helen Haste (1987) viewed children as active inquirers who make meaning through interactions in social contexts. Their work therefore paved the way for explanatory concepts about children's learning embedded in social, historical, and cultural contexts elaborated from Vygotskian and post-Vygotskian work that became available around that time. Shifts from psychological to sociocultural and poststructural explanations are reflected in work undertaken to define the concept of working theories.

Defining and theorising the concept of working theories

Te Whāriki (Ministry of Education, 1996, 2017) states that children are competent, confident, and capable learners and communicators.

Play-based and mana-enhancing experiences, exploration, and agency are central to curricular provision. The 1996 document identified working theories as one of two indicative learning outcomes alongside dispositions:

... [W]orking theories contain a combination of knowledge about the world, skills and strategies, attitudes, and expectations ... [Theories] will become more widely applicable and have more connecting links between them ... become increasingly useful for making sense of the world ... for problem-solving, and for further learning. Many ... retain a magical and creative quality, and for many communities ... are infused with a spiritual dimension. (Ministry of Education, 1996, p. 44)

In alignment with Karmiloff-Smith (1988) and Bruner (1960), the purposes of working theories were noted as for meaning making, explanation, prediction, and problem solving. Further interpretations were open to development through research and practice.

In the revised *Te Whāriki* (Ministry of Education, 2017), working theories are defined more clearly, and connected more closely with learning dispositions and inquiry-focused environments:

Working theories are the evolving ideas and understandings that children develop as they use their existing knowledge to try to make sense of new experiences. Children are most likely to generate and refine working theories in learning environments where uncertainty is valued, inquiry is modelled, and making meaning is the goal ... [L]earning dispositions and working theories ... enable learning across the whole curriculum. (p. 23)

The revised *Te Whāriki* benefited from the research and scholarly work undertaken between the two versions. Anne Meade (2008) noted an imbalance: that working theories were being neglected as an outcome of the 1996 document in comparison with learning dispositions, a finding still noted by Linda Mitchell et al. (2015) in their report on the continuity of early learning.

Sarah Jones and I drew on sociocultural ideas to develop a definition of working theories (Hedges & Jones, 2012) that has been used in a number of projects in New Zealand and internationally (e.g., Hedges, 2014; Hill & Wood, 2019):

Working theories are present from childhood to adulthood. They represent the

tentative, evolving ideas and understandings formulated by children (and adults) as they participate in the life of their families, communities and cultures and engage with others to think, ponder, wonder and make sense of the world in order to participate more effectively within it. Working theories are the result of cognitive inquiry, developed as children theorise about the world and their experiences. They are also the ongoing means of further cognitive development, because children are able to use their existing (albeit limited) understandings to create a framework for making sense of new experiences and ideas. (Hedges & Jones, 2012, p. 36)

We elaborated on this definition with examples connected with the description in *Te Whāriki* (Ministry of Education, 1996) and the idea of intellectual curiosity. We suggested supporting teachers' deeper understandings would help them to recognise and engage with working theories.

Applying concepts from Vygotsky's (1986) theory, I explored his ideas of everyday and scientific concepts, the zone of proximal development and mediation (Hedges, 2012). I showed examples where working theories seemed to act as a mechanism for developing Vygotsky's three phases of everyday knowledge in infants', toddlers', and young children's developing understandings. I also speculated that theories might be a mediating link later between everyday and scientific knowledge in older children in schooling. Early childhood settings provide many opportunities for everyday concept development to occur. These ideas reflected a cognitive focus of working theories. In later work (Hedges, 2019; Hedges & Cooper, 2014) the importance of multimodal learning was made more explicit.

Vicki Hargraves (2014b) introduced post-structural theory to research about working theories. She provided examples of children's theory building about earthquakes. Hargraves suggested that complexity theory explains ways knowledge becomes more expansive and used the Deleuzian concept of a rhizome to invoke an image of theorising as being in constant movement in unpredictable directions. These ideas help explain the importance of children's use of imagination in their theories, many of which are connected with children's purposes and intentions.

Examples of children's working theories

Both sociocultural and poststructural perspectives help explain why children are constantly engaged in inquiry. Working theories are present and ongoing in everyday moments, experiences, and events for children. Given that children's goal is making meaning about their worlds in order to participate more effectively, children's interests and working theories therefore encompass every aspect of human living and ways of knowing and being.

Sally Peters and Keryn Davis (2015) highlight the richness of young children's ideas, and, importantly, question adults' assumptions about these ideas. They identified wide-ranging interests and related working theories connected by three themes: making sense of the physical world, social world, and language. They found evidence that adults can grow children's theories when they listen, relinquish power, enable children to pursue creative and innovative thinking in ideas of interest, and identify the logic connecting children's theories.

Michelle Hill (from Switzerland) and Elizabeth Wood (from England) explored children's peer cultures as sources of interests-related working theory construction and collaboration visible in children's play (Hill & Wood, 2019). Three themes identified which related to children's interests and working theories were human nature, the social world, and the physical and natural world. These themes have alignment with the findings of Peters and Davis (2015). Hill and Wood focused in this article on examples of children's interests in existential matters of life, death, and dying.

A common interest might be developing a physical skill such as jumping. Maria Cooper and I argued it is important to show the complexity of learning as multimodal in such a seemingly simple skill, and in doing so make associated theorising visible. We analysed a toddler learning to jump as a combination of "knowledge about the world, skills and strategies, attitudes and expectations" (Ministry of Education, 1996, p. 44). We suggested that knowledge is recognisable as potential academic learning; that skills and strategies are learners' ways of doing and being necessary to build on prior personal experience; and that attitudes and expectations are the dispositional and metacognitive components of learning (Hedges & Cooper, 2014). Another common

interest is making and sustaining friendships. Maria and I showed the value of video footage to capture nuances of children's efforts to be friends. We analysed two vignettes that identified children's working theories about friendship making (Hedges & Cooper, 2017).

Keryn Davis and Ruta McKenzie (2018) undertook research with an important foundational assumption that kaiako who notice children's working theories about identity, language, and culture can work to support these more strongly. They identified four types of working theories: making sense of cultural values and practices; making sense of connections; making sense of their cultural selves; and making sense of others. All were underpinned by shared planned and spontaneous experiences that fostered multiple cultural understandings by kaiako and children. In turn, these nurtured confidence and richness in working theories. Opportunities for children to share ideas, and for teachers to listen closely, were central to findings.

Children's interests may also include topics that some kaiako find uncomfortable. They might find it difficult to allow children to express and explore related working theories, and challenging to accept and respond to these. Janette Kelly-Ware (2016) found evidence that children explore gender and sexualities in flexible ways that resist dominant norms, and that teachers have the power to either empower or tightly control such explorations and understandings. Kathryn Morgan (2020) investigated children's working theories about gender diversity and LGBTIQ-parented families and then ways teachers could use picture books to challenge these. Working theories therefore serve important purposes in ongoing learning and participation, including that children infer messages related to a hidden curriculum about the acceptability of certain interests. Teachers can become aware of this hidden curriculum through reflecting on and addressing their own beliefs and assumptions.

A first step for teachers is understanding that working theories are not just about children's knowledge development, but serve a range of purposes to help children make meaning of their life experiences is. These studies also showed that children's knowledge development is not linear but meanders, sometimes creatively, as they earnestly attempt to connect prior and new experiences in their meaning making.

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Further kaiako understanding and knowledge

If working theories are to be recognised as a vital way in which children learn, it is critical that kaiako have sufficient professional knowledge about them. Although *Te Whāriki* was first published in 1996, it is only recently that some professional learning about working theories has become available. Hence, around 10 years ago, I found that working theories were still largely overlooked in teacher education; teachers instead relied on practice-based understandings. An idea teachers articulated and found helpful was that working theories involved “snippets” of knowledge and information. Teaching strategies

included responding to, extending, and complicating theorising. A lack of emphasis on working theories in documentation was explained firstly as being because learning stories, as a dominant assessment method, prioritised dispositions; and secondly, because parents may think kaiako weren't "teaching", or were allowing incorrect ideas to develop, if working theories were documented (Hedges, 2011).

Longstanding developmental theories taught in teacher education have some relevance to understandings of working theories. However, experienced teachers need to update their professional knowledge to develop understandings that are more current. In turn, teachers could explain the role and importance of working theories to parents and whānau so these can be documented (see Hedges & Cooper, 2014). For example, in one article I drew on a range of sociocultural perspectives to connect working theories, participation, inquiry, thinking, and intellectual curiosity. I showed with examples that theories are about children's inquiry into serious and meaningful issues related to their place in their worlds; they are tentative and speculative, open to revision, and may involve imaginative and inventive ideas and resourcefulness (Hedges, 2014). Recently, I have synthesised ideas of post-Vygotskian scholars to propose contemporary principles for children's learning and illustrated these through working theories (Hedges, 2021).

Further, if working theories are to be central to curriculum design, then debates about learning, assessment, curriculum, pedagogy, and outcomes need revisiting. A longstanding and critical debate in early childhood education has often polarised child-centred and teacher-directed curriculum experiences; the following two articles suggest that focusing on working theories provides a way to place children's ideas and interests centrally in curriculum while also paying some attention to goals mandated by curriculum documents.

Joy Cullen and I argued that a "participation plus" model of pedagogy invites alternate conceptions of outcomes that contest traditional academic or developmental ones. As an outcome, working theories combine multifaceted processes of learning and innovative knowledge construction. While continuing to encourage choice, inquiry, initiative, identity, and independence, we suggested that kaiako think differently about designing educational environments (Hedges & Cullen,

2012). Elizabeth Wood and I contrasted two positions—developmental and educational psychology, and critical policy frameworks—from which to understand curriculum content, coherence, and control. We proposed that a third position focused on working theories offers alternatives for informing curriculum that retains children at the centre, and resists normative and school readiness discourses (Wood & Hedges, 2016).

Extending on these ideas of participation and curriculum control, Sofie Areljung (from Sweden) and Janette Kelly-Ware (2017) provided an important reminder of the power that teachers have in determining whether or not children's working theories are listened to, engaged with, and explored in curriculum planning and interactions. Power was viewed as whether teachers value and reify working theories, and when and if they give theories time to be shared and develop over time. Risk was first defined as touching on sensitive subjects or difficult knowledge, and then extended to include lack of teacher subject knowledge, creating an unpleasant atmosphere for children, and reducing children's ability to think creatively.

Kaiako responses and pedagogy

Placing working theories centrally as an outcome of children's early childhood experiences means that kaiako need a range of pedagogical knowledge and strategies to engage with and respond to children's interests and theorising. First, a reminder that infants, toddlers, and young children express their working theories in multiple embodied and communicative ways (Cooper et al., 2012). Each study outlined in the previous two sections illustrated the importance of kaiako and researchers knowing children, families, and cultures well. Collectively, they showed that it is vital for kaiako to listen beyond and behind the surface of theories expressed to try to interpret children's multimodal communications, and important to identify the connections between ideas and theories that children are creating, expressing, and acting upon. This section outlines further responses specific to particular studies but that likely have transferability to other settings.

Empowering children to express, inquire, puzzle over, critique, reform, and reframe their many theories can be both a rewarding and challenging part of teaching. These interactions require positive and warm relationships where kaiako utilise a range of pedagogical strategies

appropriate to child/ren, topic, and context, and avoid "hijacking" interests through surface understandings, misunderstandings, or a desire to divert to simplified academic learning (Davis & Peters, 2011a, 2011b; Peters & Davis, 2011). Rachel Winslow (2020) found the arts, specifically play with puppets, is a way to reduce power relations with children and become co-inquirers in children's theorising.

Sally Peters and Keryn Davis (2011) uncovered further pedagogical dilemmas. The first was selecting which theories kaiako might develop—kaiako decided to focus on theories that appeared to be more than fleeting. These often led to deep interests, some of which could be developed over time. Secondly, children's questions were often opening a conversation to share their own theorising rather than seeking information, so kaiako sometimes needed to hold back contributions to see what unfolded. Thirdly, if children's theories appeared stable and resisted input, kaiako queried if they were still "working" or if they were somewhat fixed. As with Hedges (2011), kaiako initially felt discomfort about appearing to allow inaccuracies, but as they explored where and how to extend or disrupt existing theories, they identified which pedagogical approaches appeared most helpful in each situation.

Further studies have offered additional teaching roles, strategies, and approaches to empower, encourage, and extend children's development and expression of working theories. Vicki Hargraves (2014a) offered a detailed vignette of working theories about earthquakes. She suggested two themes for responses: "focusing in", and "stretching out". Two pedagogical strategies for focusing in were centring on a theme, and supporting the visibility of ideas. Two strategies for "stretching out" were providing a context for sharing ideas, and extending the breadth and depth of theorising in progress. Daniel Lovatt (2014) examined in-depth children's theories about purposes, characteristics, and features of hearts and blood in humans and animals. Practical pedagogical strategies of using a stethoscope and visiting a local medical centre enabled kaiako to sensitively challenge and develop understandings. Like Peters and Davis (2011), Lovatt also found Piagetian concepts of equilibrium and disequilibrium valuable to explain changes in children's thinking (Lovatt & Hedges, 2015). He identified six teaching strategies used during sustained dialogue to provoke disequilibrium: facilitating inquiry and

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focusing a conversation; summarising children’s ideas and thinking, adopting a tentative tone; using open-ended questions to clarify thinking; presenting new information; modelling inquiry and information-seeking approaches; and using resources. The Vygotskian concept of mediation provided a theoretical foundation for understanding combining strategies.

Sally Peters, Keryn Davis, and Ruta McKenzie (2018) offered ideas for pedagogy that bring together key points in this section. They advised kaiako to listen carefully to the ways young children think and wonder about the world around them. They also suggest that kaiako create authentic learning opportunities for young children that are interest-focused, and form a repertoire of strategies that help, rather than hinder, the development of thinking. Concerns were again raised about power and choices that adults make around which theories are listened to, explored, and developed.

Conclusion and future research

Working theories are an innovative and holistic outcome in *Te Whāriki*. They highlight the multimodal ways that children learn and express their developing understandings as they engage with others to make sense of and participate in their families, communities, and cultures. Significant research, reviewed in this article, has occurred to define, theorise, elaborate on, and exemplify working theories, and provide guidance for pedagogy. Kaiako now have plenty at their fingertips to help them understand this outcome and action it in their curriculum, assessment, and pedagogy.

It is likely there are further projects in progress or completed, ripe for publication, such as Daniel Lovatt’s PhD on teachers’ support of children’s STEM-related working theories and Simon Archard’s PhD on children’s working theories about disability. Scope for future practice-based research investigations include: further specific topics of children’s theorising, especially topics adults might be uncertain about how to understand or respond to; ways to document working theories and working theory development over time; exploration and application of Māori concepts and examples given the bicultural aim of *Te Whāriki*; and debates about the place of kaiako subject knowledge in responding to children’s theorising. The two ideas about alternative educational environments (Hedges & Cullen, 2012) and working theories as central to curriculum (Wood & Hedges, 2016) also remain ripe for future research and scholarship.

Further reading

Encyclopaedia entry

Hedges, H. (2019). Working theories: Children’s curiosity, cognitive development and critical thinking. In M. A. Peters (Ed.), *Encyclopedia of teacher education*. Springer. https://doi.org/10.1007/978-981-13-1179-6_89-1

This short encyclopaedia entry is useful for kaiako, undergraduate, and postgraduate students.

Teaching and Learning Research Initiative reports

Davis, K., & McKenzie, R. (2018). Children’s working theories about identity, language, and culture. http://www.tlri.org.nz/sites/default/files/projects/TLRI%20Summary_Davis%20for%20web.pdf

Davis, K., & Peters, S. (2011). Moments of wonder, everyday events: Children’s working theories in action. http://www.tlri.org.nz/sites/default/files/projects/9266_%20davis-summaryreport.pdf

Hedges, H., & Cooper, M. (2014). Inquiring minds, meaningful responses: Children’s interests, inquiries and working theories. http://www.tlri.org.nz/sites/default/files/projects/TLRI_Hedges%20Summary%28final%20for%20website%291.pdf

My blog on working theories

<https://helenhedgesworkingtheories.wordpress.com/> (Suggestion: start at the first post if you are a new reader.)

Te Whāriki online on Te Kete Ipurangi

<https://tewhariki.tki.org.nz/en/teaching-strategies-and-resources/working-theories/>

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