Weaving key competencies into the curriculum: Examples from other nations

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Introduction

This is the fourth paper in a series that considers ongoing curriculum work in New Zealand. This paper reports on an investigation of how key competencies have been included in curriculum structures elsewhere.

The first and second papers were retrospective, the first[1] looking back to the origins of the key competencies included in the *New Zealand Curriculum* (*NZC*)[2] and the second[3] analysing the research-based trajectory of thinking about the curriculum work that key competencies should perform. The third paper[4] considers our current thinking about the key competencies in relation to the OECD's "2030" curriculum development agenda. The final paper in this series (paper 5)[5] draws on all four of the other papers to propose potential "next steps" for curriculum development work in New Zealand.

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1 Hipkins, R. (2018). *How the key competencies evolved over time: The evidence base*. Wellington: NZCER, available at www.nzcer.org.nz/research/publications/key-competencies-evidence-base

2 Ministry of Education. (2007). Wellington: Learning Media. Available at http://nzcurriculum.tki.org.nz/The-New-Zealand-Curriculum

3 Hipkins, R. & McDowall, S. (2018). *How the key competencies evolved over time: Insights from the research.* Wellington: NZCER, available at www.nzcer.org.nz/research/publications/key-competencies-insights

4 Hipkins, R., McDowall, S., &Wood, B. (2018). How key competencies are treated in the OECD '2030' framework: Implications for the *New Zealand Curriculum*. Wellington: NZCER.

5 Hipkins, R., McDowall, S., Darr, C., & Bolstad, R. (2018). *Next steps for key competencies in New Zealand's curriculum.* Wellington: NZCER.

What we looked for

Many nations have a high-level structure (e.g. a vision statement, or an overarching framework) that includes key competencies as one element. However, the New Zealand experience has amply demonstrated the challenges of weaving a coherent curriculum from such high-level curriculum thinking (see paper 2 in this series). As we prepared to write this paper, we made the decision to only investigate nations where there was evidence that a serious attempt had been made to create greater coherence by demonstrating ways to purposefully weave key competencies together with other elements of the curriculum.

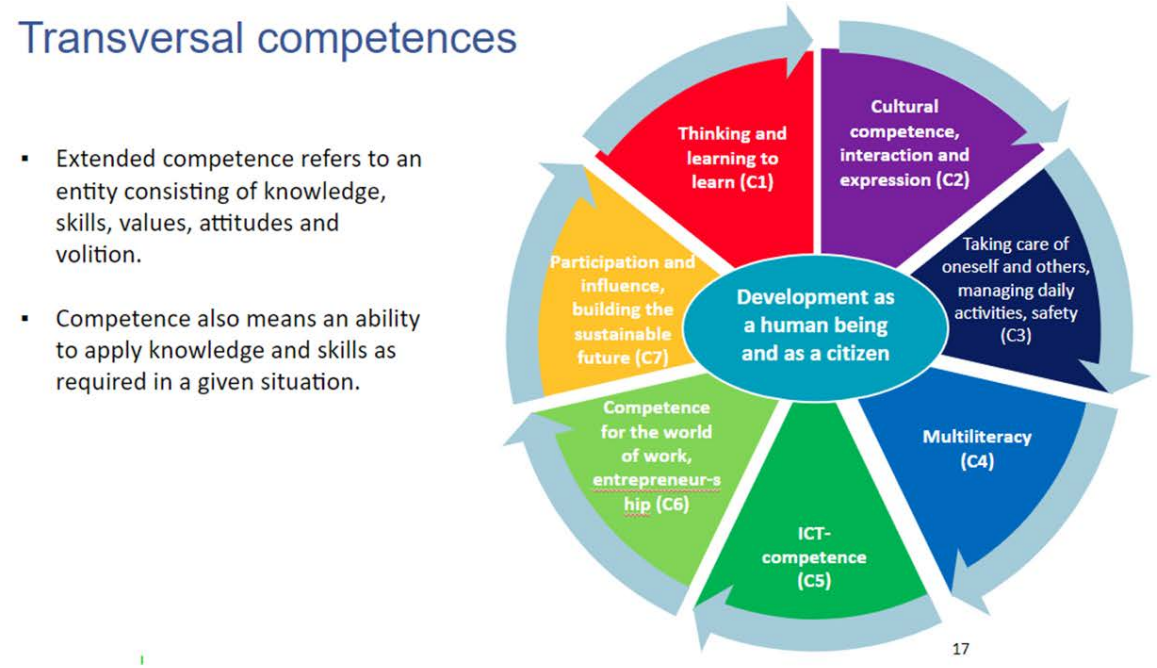
We found two examples: Finland; and British Columbia in Canada. The different ways in which each of these places has gone about creating a more woven curriculum is outlined next. Because Australia is our nearest neighbour, we also include a short discussion of the Australian national curriculum in the paper as an interesting counter-instance. Like *NZC*, the Australian national curriculum requires some active weaving to achieve coherence but we did not find clear examples that model this.

Finland

The basic curriculum framework for Finland was developed by the Finnish National Agency for Education. Schools are expected to design a local curriculum from this framework.

The Finnish curriculum has seven transversal competences with evident similarities to the NZC key competencies. These are shown in Figure 1.[6]

Figure 1



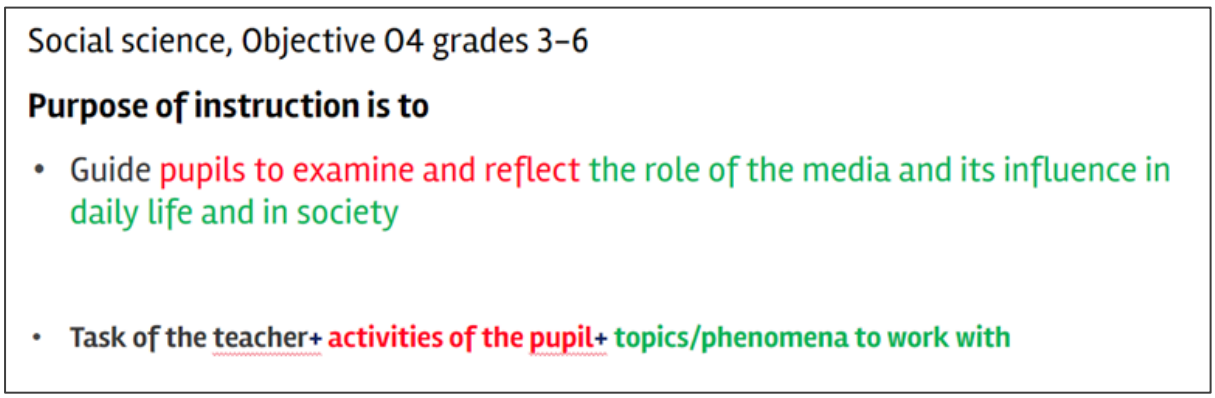
[6] All the visual models from Finland have been sourced from a presentation given by Arja-Sisko Holappa at a curriculum conference in Alberta, Canada in January 2017. Arja is a curriculum development expert at the Finnish National Agency for Education.

Notice the centrally positioned vision that emphasises both “human being” and citizenship.

As well as developing these transversal competences, other recent changes to Finland’s curriculum include: development of multidisciplinary learning modules; an intention to reduce curriculum overload; an emphasis on assessment for learning; updating of “goals of instruction” in each subject; and reform of the pupil welfare system. There are evident similarities to some of the next steps recommended by our curriculum working group (see paper 5 in this series).

The work to update goals for instruction is where we see the weaving efforts. The next figure shows how the weaving strategy was introduced to the Canadian audience at the conference from which these images were sourced.

Figure 2



Notice how the structure of the learning objective models a weaving of: teacher pedagogy (in black); student learning opportunities (in red); and a topic that is expressed as a “big idea” rather than specific content. Schools are expected to build a local curriculum that translates these national curriculum objectives into locally salient contexts. This local curriculum also needs to ensure that over the whole of a course of learning students encounter important learning area content. In other words, the weaving emphasis rests on *pedagogy* and *purpose*, with selection and weaving of content and contexts left up to schools and teachers.

Notice also that the transversal competences are not evident in the structure of the learning objective. The next figure was used to illustrate a range of actual learning objectives. It also shows how transversal competences are aligned with the objectives (see right hand column).

Figure 3

Objectives of instruction	Content areas	Transversal competencies
O5 to support the pupil in solving mathematical assignments that require logical and creative thinking and in developing skills needed in it	C1–C6	T1, T3, T4, T5, T6
O6 to guide the pupil to evaluate and develop his or her mathematical solutions and to examine critically whether the result is reasonable	C1–C6	T1, T3, T4, T6
O7 to encourage the pupil to apply mathematics also in other subjects and in society	C1–C6	T1 - T7
O15 to guide the pupil to understand the concept of the variable and to acquaint him or her with the concept of the function. To guide the pupil to practise interpreting and producing the graph of a function	C3, C4	T1, T4, T5

In effect, this alignment suggests that most competences can be aligned with most learning, presumably depending on what is foregrounded during the actual learning. While our own research would support this argument in principle (see paper 2 in this series) such in-principle alignment led to over-assimilation of key competencies in the early years of *NZC*. Teachers would add a "key competencies" column to existing curriculum plans, much like the above example, and then say "we already do that". This leads us to suggest that, while interesting and innovative in one way, this partial weaving solution is not going to provide a ready-made next step for our own curriculum.

British Columbia

The new curriculum for British Columbia was developed by the provincial Ministry of Education. [7]

This curriculum includes six "core competencies" with strong similarities to the *NZC* key competencies: communication; creative thinking; critical thinking; positive personal and cultural identity; personal awareness and responsibility; and social responsibility.

Profiles and illustrations provided on the website document the intended scope of each core competency. These materials take the form of downloadable PDFs, as illustrated here for critical thinking.

[7] www.curriculum.gov.bc.ca/

Figure 4

Critical Thinking Competency Profiles (PDF)

present an overview and the set of profiles. The overview provides background about the critical thinking competency and includes a description of its facets. The set of profiles are descriptions of students as they progress to sophisticated stages of competency. The profiles are written from the student's point of view, reflecting student ownership and responsibility for demonstrating the competencies.

Download the Critical Thinking Competency Profiles in English or French

On the BC curriculum web pages, models of progression are provided for each of the six core competencies, with examples from different learning areas. These progressions are supported by student self-assessment statements. We support this development in principle, but note that later in this paper we express some reservations about the detail of these progressions, and relate our concerns to the manner in which they were created.

There is also a new Foundation Skills Assessment for all Grade 4 and 7 students, with a focus critical thinking; communication skills; and "deeper learning".

These generic core competencies are translated into "curriculum competencies" which are expressed as sets of objectives for every subject area, at every curriculum level (see Figure 5).

Essentially, objectives for the curricular competencies specify what students will *do* during their learning, as shown by the illustrative examples in Figure 5. Note that some of these lists are longer than shown, running over two pages.

Figure 5

BRITISH COLUMBIA
Ministry of Education

Area of Learning: SCIENCE — **Kindergarten**

BIG IDEAS

Plants and animals have observable features.	Humans interact with matter every day through familiar materials.	The motion of objects depends on their properties.	Daily and seasonal changes affect all living things.

Learning Standards

Curricular Competencies	Content
Students are expected to be able to do the following: **Questioning and predicting** • Demonstrate curiosity and a sense of wonder about the world • Observe objects and events in familiar contexts • Ask simple questions about familiar objects and events **Planning and conducting** • Make exploratory observations using their senses • Safely manipulate materials • Make simple measurements using non-standard units **Processing and analyzing data and information** • Experience and interpret the local environment • Recognize First Peoples stories (including oral and written narratives), songs, and art, as ways to share knowledge • Discuss observations • Represent observations and ideas by drawing charts and simple pictographs **Applying and innovating** • Take part in caring for self, family, classroom and school through personal approaches • Transfer and apply learning to new situations • Generate and introduce new or refined ideas when problem solving **Communicating** • Share observations and ideas orally • Express and reflect on personal experiences of **place**	*Students are expected to know the following:* • **basic needs** of plants and animals • **adaptations** of local **plants** and **animals** • **local First Peoples uses** of plants and animals • **properties** of **familiar materials** • **effects of pushes/pulls** on movement • effects of size, shape, and materials on movement • **weather** changes • **seasonal changes** • **living things make changes** to accommodate daily and seasonal cycles • First Peoples knowledge of seasonal changes

Although the structures of the curricula are very different, there are some similarities between the weaving approaches in Finland and BC. There are both similarities and differences in the way content is treated in the two curricula. Like Finland, the curriculum for BC expresses "big ideas" for each subject at each level. Whereas these are woven into the structure of the objectives in Finland, they are positioned as over-arching both curricular competencies and content in the BC structure. And the BC content itself is presented as a definitive list of topics that students are "expected to know".

The BC curriculum developers explain their approach as one of know/do/understand. However it seems to be left to schools to create the actual weaving of traditional content (know), with partially woven curricular competencies (do), and big ideas (understand). In that sense all the challenges that have pertained to understanding the role of the key competencies in NZC (paper 2 in this series) can still be anticipated here, notwithstanding the evident conceptual innovation.

Would these weaving strategies be useful for next NZC steps?

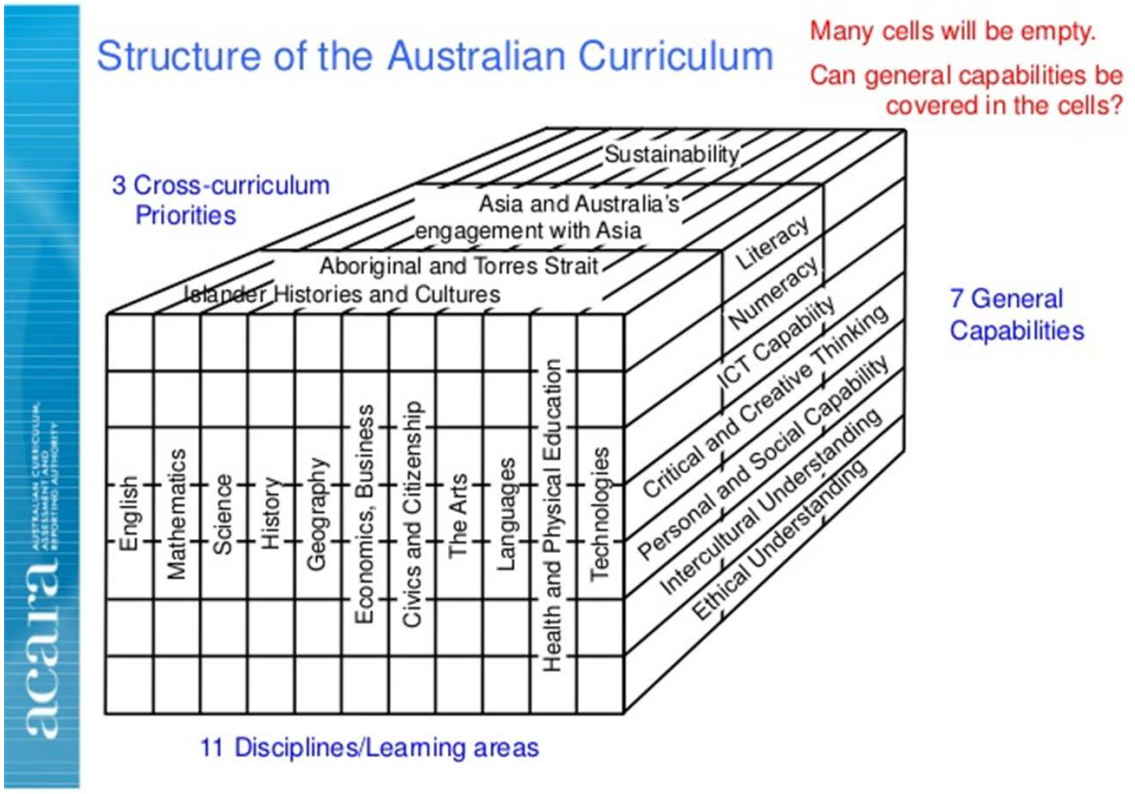
Participants in our workshop (see paper 5 in this series) found the structures of these two curricula interesting. However, a consensus emerged that neither nation's weaving approach should deflect us from our current trajectory of developing a deeper understanding of the role that key competencies play in the overall curriculum (see paper 2 in this series).

There was clear support for the maintaining and further developing the current approach to using rich learning experiences as a gathering point for weaving key competencies together with other curriculum elements. This approach was seen to have the potential to stimulate and sustain rich and deep curriculum thinking. The group noted that, notwithstanding their inspirational high-level designs, the specifics of actual learning objectives in both the international examples we considered conveyed an impression of "business as usual".

Australia

Australia has a national curriculum which the various states modify to suit their own education systems. As Figure 6 shows, there are seven general capabilities that are approximate equivalents of the *NZC* key competencies. The *NZC* principles are arguably the closest equivalent to the "cross-curriculum priorities" shown along the top of the structure below.

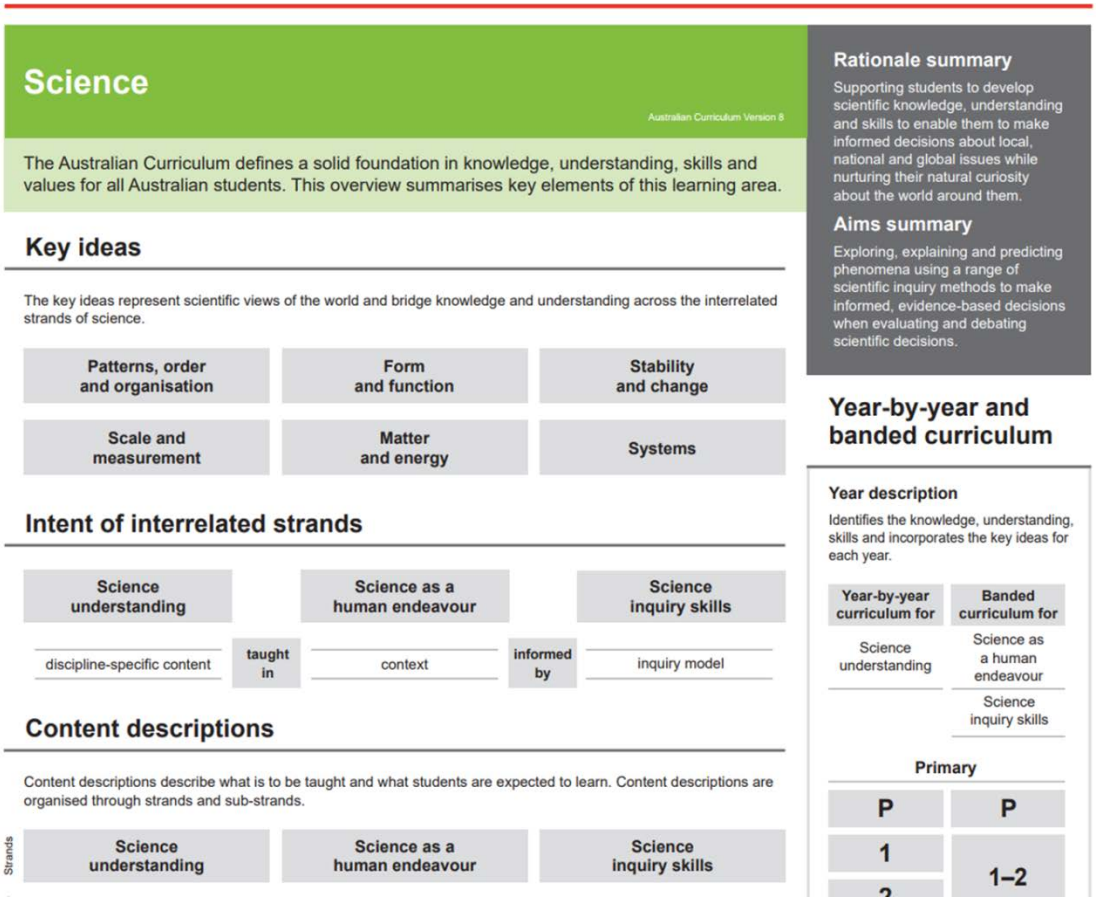
Figure 6



This figure implies the need for a weaving of elements but it appears to be left up to the different states to find ways to do that. It cannot be an easy task because there is a lot of detail in all of these elements. Notice that—at least when this diagram was produced—the curriculum development authority itself (ACARA) was still asking questions about what might appear at the intersection of the elements

Figure 7 drills down to the structure of one learning area. We again chose science so that this structure can be compared with the BC curriculum example above. This figure is a partial snapshot of the elements of the science curriculum as these were first envisaged at the national level. Again, a lot of weaving is implied by the juxtaposition of multiple elements. Note that the general capabilities are not readily apparent. How, if at all, are they related to all these other details?

Figure 7



(Note that this figure has been cut off before the actual level-by-level content descriptions.)

The missing element is the more innovative big ideas that constitute the "understand" element in the BC structure. How should the "key ideas" that run across the top of the overview be woven in?[8] Without this more purposeful weaving, it is also not clear how this specified learning contributes to the bigger "whole" depicted in ACARA's model for the structure of the whole curriculum.

The states we investigated appear to have stuck reasonably closely to the structure and specifications of the national curriculum. There are some differences but no weaving solutions to report.

Building curriculum ownership: Opportunities and challenges

Is a sense of 'business as usual'—even when there are innovative design intentions—related to the need to build wide curriculum ownership?

There are certainly some indications that this might be the case in the BC curriculum development, where working parties were set up to seek maximum collaboration and input from teachers. As one example, teachers helped build a sense of what progress might look like in developing the core

[8] These key ideas have strong similarities to the "cross-cutting concepts" used to shape the "next generation" of Common Core Assessment Standards in the USA: https://www.nextgenscience.org/

competencies at different ages, and translating this sense of development into the different learning areas.

Figure 8 comes from a set of OECD briefing materials that included a discussion of the BC curriculum. This figure was included in the appendices of that paper and purports to show how core competencies translate to curriculum competencies in science and convey a sense of progression across the levels.

Figure 8

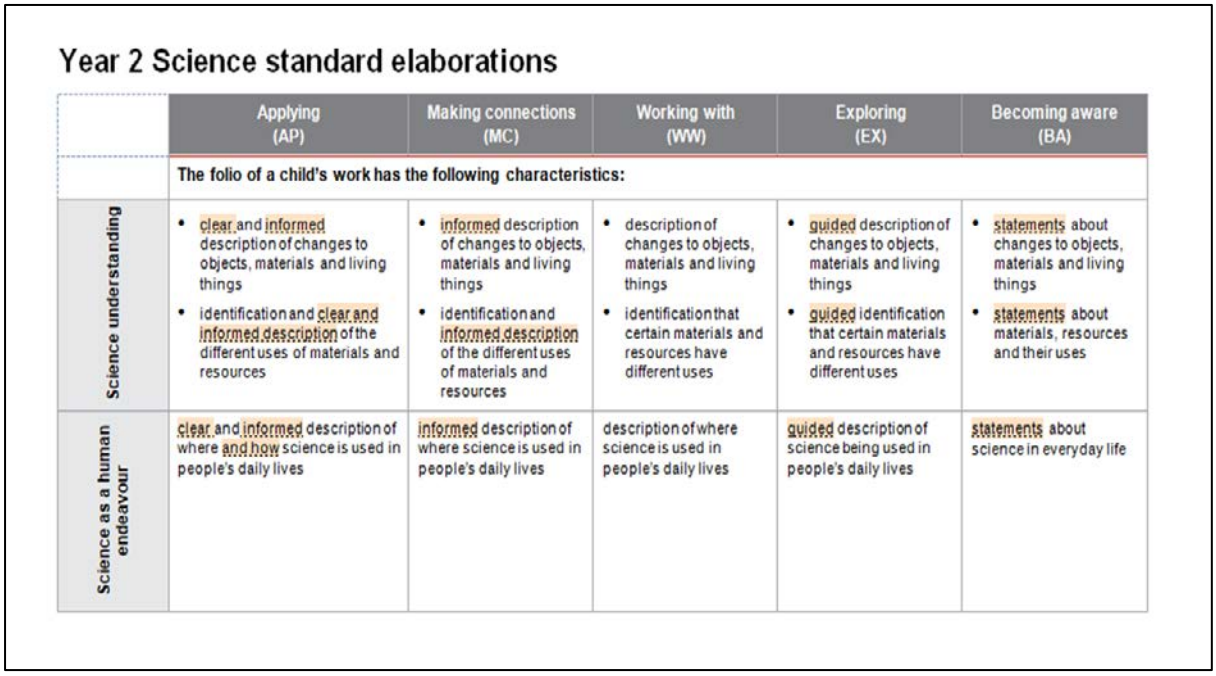
	K	3	6	10
Thinking	Demonstrate curiosity and a sense of wonder about the world	Demonstrate curiosity about the natural world	Demonstrate a sustained curiosity about a scientific topic or problem of personal interest	Demonstrate a sustained intellectual curiosity about a scientific topic or problem of personal interest
Communication	Share observations and ideas orally	Represent and communicate ideas and findings in a variety of ways, such as diagrams and simple reports, using digital technologies as appropriate	Communicate ideas, explanations, and processes in a variety of ways	Communicate scientific ideas, information, and perhaps a suggested course of action, for a specific purpose and audience, constructing evidence-based arguments and using appropriate scientific language, conventions, and representations
Personal and Social	Contribute to care for self, family, classroom, and school through individual approaches	Contribute to care for self, others, school, and neighbourhood through individual or collaborative approaches	Contribute to care for self, others, and community through individual or collaborative approaches	Contribute to care for self, others, community, and world through individual or collaborative approaches

There is an evident degree of sematic incrementalism in these statements, not dissimilar to that which pertains in many of the NCEA achievement standards (although those differentiate performance at one level, not across stages of schooling). This is not uncommon when a strongly theorised and seemingly innovative framework is populated with practical detail by teachers.

The same tendency to sematic incrementalism is also apparent in the translation of the Australian level 2 science (above) to the Queensland "standard elaboration" shown in Figure 9 (the highlighting is in the original). [9]

[9] www.qcaa.qld.edu.au/downloads/p_10/ac_sci_yr2_se.pdf

Figure 9



Year 2 Science standard elaborations

	Applying (AP)	Making connections (MC)	Working with (WW)	Exploring (EX)	Becoming aware (BA)
	The folio of a child's work has the following characteristics:				
Science understanding	• clear and informed description of changes to objects, materials and living things • identification and clear and informed description of the different uses of materials and resources	• informed description of changes to objects, materials and living things • identification and informed description of the different uses of materials and resources	• description of changes to objects, materials and living things • identification that certain materials and resources have different uses	• guided description of changes to objects, materials and living things • guided identification that certain materials and resources have different uses	• statements about changes to objects, materials and living things • statements about materials, resources and their uses
Science as a human endeavour	clear and informed description of where and how science is used in people's daily lives	informed description of where science is used in people's daily lives	description of where science is used in people's daily lives	guided description of science being used in people's daily lives	statements about science in everyday life

Research to develop indicators of progression in the capabilities selected for analysis in NMSSA begins from a different premise. Rather than asking, in essence "and what would come next?" the NMSSA team is more interested in indications of developmental differences in what students show they can *do* with their learning when presented with specific rich tasks that weave key competencies and content together. While this research is still in its early stages, there are already indications that broadly banded developmental differences can be described for each of the named capabilities. These differences are more concrete than differences suggested by a change of adjective (sustained, informed, critical, clear, etc.) and hence should be more informative for decisions that teachers make about next steps, as well as making the actual judgements less fraught to make.

Bringing research and practice together

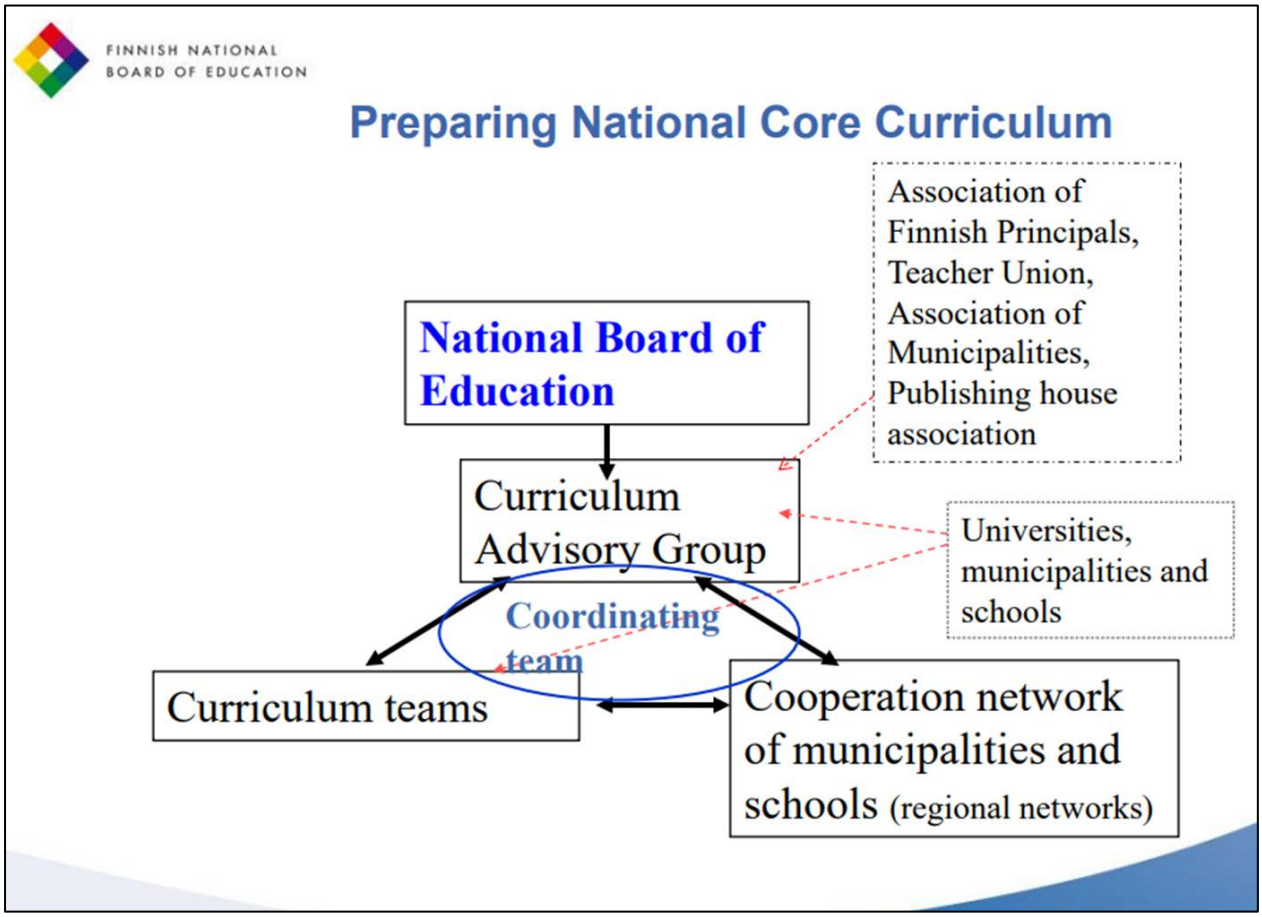
It will be clear from the comments just made that our preference is for the development of progressions that are informed by careful research, grounded in the realities of what students actually show they can do. Since we are expecting them to demonstrate capabilities that have not been an explicit focus for traditional assessment practice, we cannot rely on teachers' past experience alone. To do so will almost inevitably result in semantic incrementalism, as we have just seen in the examples of BC and Australia. This is a conundrum because we do need teachers to be actively involved, to give in-principle support to curriculum developments, and to see ways to realistically bring these new ideas do their classroom practice. How might we reduce tensions that might originate in the gap between research and practice?

We could not access detailed curriculum materials from Finland but it is fair to say that we did not see similar indications that assessment specifications might act to undermine innovative curriculum intentions. Indeed the emphasis on formative assessment is evident in the structure of their achievement objectives. These are very clear about what students should do, and why. In one sense

this ups the ownership ante because teachers will only be able to do what is asked of them if they have a deep understanding of what the curriculum intends.

How did Finland achieve these more comprehensive reforms, assuming that they did indeed take their teachers with them? No doubt there would be many different threads to a systems-wide answer to this question. However, the highly networked structure of their design and decision-making agencies and processes was one thing that the working group noted with particular interest (see paper 5 in this series). This structure is summarised in Figure 10.

Figure 10



Notice the initiating role of a National Board of Education. The curriculum and assessment experts inside this organisation work with an advisory group that is an important node in keeping various community organisations connected into the network. Notice also that there is a specific coordinating team to ensure that the connections flow as they should.

Concluding comment

In this paper we set out to investigate whether the designs of other national curricula might have something new and valuable to contribute to our curriculum journey in New Zealand. The "how" of curriculum weaving was our focus because our own experiences in New Zealand have demonstrated

that this is critical (see papers 2 and 3 in this series). Our conclusion is that, while interesting, the two weaving attempts that we found come with challenges we can already anticipate from implementation challenges we have already documented in New Zealand. We did, however, find an interesting example of a systems-level structure for joining up the thinking of experts and teachers that might be worthy of consideration.