



NEW ZEALAND COUNCIL FOR EDUCATIONAL RESEARCH

TE RŪNANGA O AOTEAROA MŌ TE RANGAHAU I TE MĀTAURANGA

NCEA and Curriculum Innovation: Learning from change in three schools

Rosemary Hipkins and Lorraine Spiller



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2012



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New Zealand Council for Educational Research
P O Box 3237
Wellington
New Zealand

ISBN 978-1-927151-77-8

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1. The context for this report

The central agenda for the research discussed in this report was to inform the ongoing development of robust and appropriate relationships between *The New Zealand Curriculum* (NZC) (Ministry of Education, 2007) and the National Certificate of Educational Achievement (NCEA), which is used to assess achievement of that curriculum in the senior secondary school years. An underlying premise for the research was that NCEA–NZC interrelationships need to support schools’ and teachers’ curriculum thinking along lines that enable the 21st century intent of NZC to be appropriately realised in classroom teaching and learning in the senior secondary school. With this framing in mind, the report discusses the impact of NCEA on schools’ and teachers’ curriculum thinking, and on the courses of learning that they design and enact, now that its alignment with NZC is well underway. It draws on, and contributes to, the New Zealand Council for Educational Research’s (NZCER’s) ongoing NCEA-related research.¹

A specific focus for NZCER’s research on NCEA continues to be how teachers, both individually and collectively, think about their students’ learning needs and translate this thinking into the learning experiences they design. We first investigated course-related decision making in relation to NCEA when the qualification was very new. It was, for example, the focus of the Learning Curves project which tracked actual course development/changes and teachers’ thinking about these during the first three years of NCEA implementation in six medium-sized secondary schools. To some extent the case studies discussed in this working paper can be regarded as a follow-up to that work, although the approach we took is different. Rather than repeating what we did in 2003–05, we have taken some of the challenges raised by that work, and our other NCEA-related projects, to probe more deeply into how innovative teachers and schools think about and enact curriculum change enabled by NCEA.

¹ Appendix A summarises earlier projects for reference.

Another important difference is that the current research took place in the context of a system-wide change to a streamlined national curriculum framework. NZC was developed *after* NCEA had been fully implemented, at least in the first round of adjustment and bedding in of the curriculum-related achievement standards.² For the majority of subjects offered pre-NCEA, the first sets of NCEA achievement standards were developed from previous examination prescriptions. Given these origins, they tended to perpetuate an *assessment-based* (rather than a *curriculum-focused*) framing of learning in the senior secondary school.³ The 2007 NZC conveys the clear message that the national curriculum should set the direction for learning for all students, including those in the senior secondary years, and that achievement standards should be further developed to reflect this order of priorities (see Ministry of Education, 2007, p. 41). Furthermore, NZC is explicit that:

Not all aspects of the curriculum need to be formally assessed, and excessive high-stakes assessment in years 11–13 is to be avoided. (Ministry of Education, 2007, p. 41)

Despite this clear message about priorities, many secondary teachers perceive that assessment drives the curriculum. A statement to this effect has received majority support from secondary teachers in two rounds of the NZCER National Survey of Secondary Schools (80 percent of teachers in 2006 and 75 percent in 2009 agreed or strongly agreed that “assessment is driving the curriculum now, even at Years 9 and 10”).⁴ With the results from the next round of secondary surveys due late in 2012 it will be interesting to see if this view has shifted at all, given the considerable investment the Ministry of Education (MOE) and the New Zealand Qualifications Authority (NZQA) have made in attempting to do as directed by NZC; that is, align the standards to the curriculum, not vice versa. Our discussions with a range of senior and middle school leaders during the Learning Curves research point to school structures and processes as one type of influence on teachers’ perceptions about NCEA as a constraint on curriculum innovation, but the personal beliefs of individual teachers no doubt also play a strong part. Teachers’ curriculum thinking was a specific focus for us in the current project.

If the achievement standards and the curriculum were already fully aligned in intent and priorities, the issue of assessment driving the curriculum would not matter as much. It does matter, however, because NZC potentially points to profound shifts in the types of learning outcomes to be valued and fostered. The obvious implication is that what is assessed, and the nature of the assessment tasks used, will also need to shift if the NZC vision is to be taken seriously in the senior secondary school.

² The discussion that follows will also take account of unit standards that are not directly related to the school curriculum (e.g., those developed and maintained by Industry Training Organisations (ITOs) that are used by some schools, particularly to assess learning of students in more vocationally-oriented learning pathways).

³ This insight comes from the two Shifting Balances projects that explored whether NCEA had prompted pedagogical change in the practice of leading teachers from four different subjects (see Hipkins, Conner, & Neill, 2006).

⁴ See the report *The Evolving NCEA* (Hipkins, 2010).

The evolving relationship between NCEA and NZC

The foundation NCEA standards sought to assess well-established 20th century learning outcomes. Notwithstanding an intention to open up the types of assessment tasks used, so that more students experienced opportunities to show what they know and can do, assessment via achievement standards, in particular, continued to draw largely on traditional pen-and-paper-based tasks that predominantly assess recall and application of declarative knowledge.⁵

NZC signals that something important has changed in terms of curriculum priorities. As the foreword to the document explains, the pressure to reflect wider societal changes within the structure of the national curriculum was an important driver of the development of NZC as a flexible framework curriculum. The resulting high-level framework, the so-called “front end” of NZC, has an explicit focus on supporting students to become 21st century learners. The foreword indicates that 21st century capabilities are needed to address more complex workplace demands, to work with more sophisticated technologies and to thrive within an increasingly diverse population (Ministry of Education, 2007, p. 4). The key competencies embedded in the framework (and hence across the entire curriculum, at least in theory) are defined as “capabilities for living and lifelong learning” (p. 12).

The 1–2-page statements about the *purpose* of each learning area within the overall curriculum explicitly look to students’ futures: to the sorts of young people they are now and are capable of becoming, as does the *future focus* principle. All these curriculum policy developments, and more, signal that some different sorts of outcomes are now important. The assessment implication is that NCEA should continue to evolve, unless it is already sufficiently flexible to meet the new types of curriculum outcomes implied by these high-level priorities.

At the time of writing this report, NCEA was nearing the final stages of a realignment exercise undertaken in response to the significant curriculum shift just outlined. Teachers and schools were still getting to grips with the revised NCEA standards when we carried out our case studies but their general shape was already clear. It is beyond the scope of this report to canvass the appropriateness of the alignment in every subject but changes prompted by the development of new NCEA standards in several learning areas will be discussed.

⁵ By the end of the Learning Curves project it was clear to us that achievement standards were seen as more “rigorous” than unit standards by teachers and students alike. The familiarity of high-stakes examination-style external assessments was an important influence on this type of thinking (see Hipkins & Vaughan, with Beals, Ferral, & Gardiner, 2005).

What sort of shifts might be needed in teachers' curriculum thinking?

Both the national curriculum framework and the national qualifications system were designed to maximise flexibility and autonomy for schools as they put together learning programmes that meet the needs of *all* their students. Like NCEA, NZC was developed to enable maximum flexibility for schools to design programmes that meet the diverse needs of *all* their students. Planning and reporting policies and procedures complement curriculum and assessment policy by adding the requirement to systematically inquire into the actual learning needs of students, and develop specific plans to address these.

As already noted, NCEA was developed with an explicit intention of enabling a greater number of students to experience learning success during their senior secondary school years. The goal was to open up the types of learning that could count towards qualifications, and to refocus the assessment process so that it reported on what students know and can do, rather than using assessment results to rank them by comparative success or failure, for traditional sorting purposes. Whether or not NCEA has been successful on these foundational terms is one challenge we discuss, but the working paper also takes into account more recent policy changes to the curriculum itself.

NZC signals a shift towards so-called 21st century curriculum thinking. However, the term “21st century learner” is now so widely used it is in danger of becoming a cliché. Highlighting what it might mean, a recent review of existing future-focused literature and research pointed to six emerging principles, all of which have implications for teachers' curriculum thinking:⁶

Learning should be personalised: The “logic” of the system is reversed so that learning programmes are built around the specific learning needs of the student rather than requiring them to fit into the existing system.

Ideas about equity and diversity need to be rethought: Instead of a problem to be managed in the interests of offering an equitable education to all students, diversity should be seen as a learning resource to be fostered and working with diversity as an important outcome of learning.

Rethinking the role that knowledge plays in learning: It is no longer sufficient to absorb and reproduce existing knowledge; students need to develop their capabilities to work with disciplinary knowledge to create new knowledge that addresses specific real-world issues and challenges.

⁶ This is a brief summary from *Supporting Future-oriented Learning and Teaching: A New Zealand perspective* (Bolstad et al., 2012).

Roles and relationships between teachers and learners are restructured: Teachers work with students to draw out and develop the strengths and interests that students bring to their learning. This entails learning for both sides of the partnership.

A culture of continuous learning is fostered for everyone: Teachers' needs as adult learners are also appropriately addressed, so that they are well supported to address the changes implied in the other four principles.

Strong school–community connections need to be fostered: The support of many others is needed if students are to be offered the sorts of authentic learning experiences valued in 21st century approaches such as capability building. At the same time, communities need to understand and value the sorts of shifts that schools are attempting to make.

These six principles carry the clear implication that continuing with relatively traditional learning programmes, albeit with some adjustments to how learning is assessed (e.g., via new NCEA standards) will not *adequately* address the NZC vision for a 21st century curriculum. However, any shifts along the lines signalled in the six principles are obviously to be encouraged and supported and would align well with the NZC vision. With this thought in mind, we now briefly review what is already known about teachers' current thinking as this intersects with their NCEA decision making.

Indications of current curriculum thinking

The following brief discussion of school and teacher curriculum thinking in relation to NCEA is drawn from existing NCEA research. Findings have been summarised in relation to four themes. Each theme addresses a specific type of challenge implied by the future-focused learning principles just outlined. The nature of each challenge is briefly outlined and evidence of current teacher/school thinking and action is summarised.

Course structures

A long-standing feature of secondary schools is that the content of learning comes “pre-packaged” as subjects that reflect traditional disciplinary distinctions (e.g., between science and social science, or mathematics). The “back half” of NZC is organised like this, into eight learning areas, each with suites of achievement objectives at eight curriculum levels. Nevertheless there is a clear message that appropriate achievement objectives are carefully selected by schools to “fit the learning needs of their students” (Ministry of Education, 2007, p. 39) rather than to retain the format in which they are organised for its own sake.⁷ The

⁷ The NZC principle of *coherence* also points to links across learning areas, as well as within them (Ministry of Education, 2007, p. 9).

suites of achievement standards used for NCEA assessments also mostly reflect this traditional disciplinary packaging⁸ although in theory schools can mix and match them as appropriate to innovative course design.

Critical thinking about course structures is important because learning that challenges students to wrestle with real-world issues will seldom stay within the bounds of one discipline area. Also, much “knowledge work” takes place at the intersection of different sets of ideas/bodies of knowledge.⁹ However, this is not a case of either/or—an integrated curriculum or a traditional structure. The challenge lies in learning how to work between discipline areas while respecting the intellectual integrity of each.¹⁰ Neither NCEA nor NZC *prevent* this sort of innovation, but as we now outline, removing barriers does not necessarily equate to stimulating and supporting change.

In the early years of NCEA implementation, the Learning Curves project found limited evidence of course innovation that did not conform to traditional subject structures, especially for more “academic” students.¹¹ This prevalence of traditional academic courses, with some course innovation for lower ability students, was subsequently confirmed in the much wider range of schools attended by the students in the longitudinal Competent Learners study at age 16.¹²

An online survey conducted in 2007 invited teachers to identify innovative courses in their schools. We found that innovations in *assessment* design were much more common than innovations in *subject* design (that is, teachers mixed and matched achievement and unit standards in innovative ways but these still largely assessed traditionally structured subjects). Where subject innovation was reported, it was much more likely to remain *within* a discipline area (e.g., creating a Year 13 course with elements of both calculus and statistics, which are typically taught separately). Just 11 percent of responding schools said they had developed a course that combined elements from different learning areas.¹³

In summary, at the time the project discussed in this working paper was begun, we had little reason to suppose that course innovation of a 21st century sort was other than an exception,

⁸ There are, however, some notable exceptions, such as the development of suites of standards to assess: education for sustainability; media studies; computing/digital technologies; earth and space science (not traditionally included in the science disciplines).

⁹ Jane Gilbert highlighted the implications of this for educating today’s students for tomorrow’s “knowledge work” rather than for the Industrial Age working conditions assumed by traditional schooling (Gilbert, 2005).

¹⁰ For an extended discussion of this curriculum change in relation to NZC, see Boyd and Hipkins (in press).

¹¹ The second Learning Curves report discusses three types of courses: traditional discipline; locally redesigned; and contextually focused (Hipkins, Vaughan, Beals, & Ferral, 2004). Of these, traditional discipline courses were still predominant and contextually focused courses were largely for those students deemed incapable of learning at the same level as their peers.

¹² See Wylie, Hipkins and Hodgen (2008).

¹³ This report can be accessed from NZCR’s website (Hipkins, 2007a).

and that traditional course thinking continued to dominate the structuring of learning in the senior secondary school.

Learner needs and abilities

Intelligence—or intellectual capacity—is not fixed, but is expandable (through the right kinds of experiences). Expanding people’s intellectual capacity should be *the* key function of an education system (Bolstad et al., 2012, p. 12).

Rethinking the meaning of equity and diversity is one of the five principles for a future-focused curriculum outlined above. The quote, taken from the report by Bolstad and her colleagues, highlights a really challenging shift in thinking about achievement success, and in particular the contribution made by intelligence. If schools and teachers hold a view of intelligence as fixed, success may be seen as largely proscribed within certain “realistic” constraints. These constraints influence decision making and actions in ways that, in effect, signal lower expectations than might be held for other, more “capable” students.

NZC sends clear messages that this sort of thinking is not acceptable, beginning with the principle of *high expectations*: “the curriculum supports and empowers all students to learn and achieve personal excellence, regardless of their individual circumstances” (Ministry of Education, 2007, p. 9). NZC also makes clear that assessment stands first and foremost in the service of learning and is integral to teachers’ thinking about the effectiveness of their own practice (Ministry of Education, 2007, p. 40). As already noted, NCEA was similarly intended to open up learning opportunities that would allow every student to experience success in personally meaningful and challenging learning. But has this optimistic vision that all learners can be intellectually challenged and extended in worthwhile ways been realised in practice?

Easier versions of traditional courses were one immediate response to NCEA in the Learning Curves schools. We found this differentiation in the very first year of the Learning Curves project. We were unsure at the time whether this was a “good thing” (i.e., it really would open up learning success in the ways that the teachers claimed). By the end of the third year of the project we reluctantly concluded that, instead of opening up high expectations for all learners, NCEA had instead acted to consolidate the traditional academic/vocational distinction made by schools, a distinction that curtailed the learning pathways kept open for some students. A larger scale research programme carried out by the Starpath team at The University of Auckland supported and extended our early findings. The Starpath team

explicitly focused on the dilemma that less academic students can find themselves in dead-end courses that do not keep their learning pathways open.¹⁴

In contrast to these findings, which draw attention to the potential for negative consequences if NCEA's flexibility is not well used, the Innovative Pathways from School project, completed just before NCEA was introduced but after unit standards had become well established, provides a different perspective. This project pointed to the empowering potential of alternative courses *if* they do support students to experience success and at the same time keep them focused on an ongoing learning pathway that extends beyond their school years.¹⁵

Just as the current report was being completed, MOE reversed a decision to withdraw a suite of unit standards used to assess some Year 11 science courses. These standards have been criticised because they forestall further study in the sciences: they are simply not demanding enough to prepare students to enter other science courses. This reversal announcement was made at a conference for science teachers so we were able to observe reactions. Some teachers were delighted while others were very disappointed that their ability to challenge low expectations had just been undermined. In this view, so long as the low-level option was available to them, some colleagues would not see any need to think more laterally and creatively about how to meet the learning needs of their lower ability students and keep them in viable pathways.

This is clearly an area of considerable challenge for rethinking practice and in the case studies that follow we look at some of the different ways all three schools have addressed some of the implicated pathways issues. These are particularly acute in view of the current government target that 85 percent of students should achieve at least a Level 2 NCEA qualification.

Purposes for, and outcomes of, learning

We have already noted that the early NCEA standards were largely developed from pre-existing examination prescriptions. Given this provenance, it is not surprising that they tended to reflect traditional learning outcomes related to demonstrating successful recall and application of knowledge. However, as outlined above, a 21st century curriculum points to different sorts of knowledge outcomes and demonstrations of learning, with obvious implications for what might count as assessment evidence. There are huge challenges for teachers and schools here, because curriculum approaches and the purposes to be prioritised are hotly contested matters.

¹⁴ This team recently developed their findings into a book that speaks directly to parents and students about how to make good NCEA choices, including avoiding those that lead to dead ends as far as ongoing learning plans are concerned (Madjar & Mckinley, 2011).

¹⁵ The final report can be found on NZCER's website (Boyd, with McDowall, & Ferral, 2006).

The twin Shifting Balances projects (see Appendix A) followed hard on the heels of the Learning Curves project. They pointed to interesting possibilities for shifts in teacher thinking when new curriculum purposes are meaningfully reflected in assessment standards: that is, these purposes are not just paid lip service and the curriculum really does drive what is seen as important and hence assessed. The second Shifting Balances project found that home economics had profoundly changed as a subject, whereas science, mathematics and geography had not.¹⁶ The difference did indeed appear to reside in the origins of their NCEA standards. Those for science, mathematics and geography were based on previous examination prescriptions, while those for home economics were written to the 1990s Health and Physical Education curriculum (Ministry of Education, 1999). This curriculum document was one of the last of the 1990s curriculum suite to be developed. It employed a sociocultural theoretical framework and reframed purposes for learning in its three subjects (health, PE, home economics) in a way that the curricula developed earlier in the decade had attempted but not done as successfully.¹⁷ This shift pointed to quite different types of learning outcomes that subsequently led to a profound rethinking of the learning experiences home economics teachers offered their students.

The introduction of an eighth learning area to NZC provides a more recent example of the same tensions and challenges in play when reframing purposes for learning, with associated shifts in assessment practice. Debates about the achievement standards to be developed to assess the Learning Languages learning area of NZC centred around the priority to be given to *communication* purposes for learning a language. The more traditional purpose is to build and demonstrate accurate language knowledge (via a traditional “grammar/translation” approach to teaching and learning). NZC clearly prioritises communication, with accuracy just one of the factors to be taken into account:

In the core Communication strand, students learn to use the language to make meaning. As their linguistic and cultural knowledge increases, they become more effective communicators, developing the receptive skills of listening, reading and viewing, or the productive skills of speaking, writing and presenting or performing. (Ministry of Education, 2007, p. 24)

The Learning Languages achievement standards, developed post-NZC, reflect this communication priority. This has, in the view of researchers in this area, resulted in positive changes in teachers’ curriculum thinking and action.¹⁸ In Section 3 we report on a similar shift in history teachers’ thinking, and the role NCEA has played in prompting this.

¹⁶ Hipkins et al. (2006).

¹⁷ For an account of tensions in science, for example, see the essays in Bell and Baker (1997).

¹⁸ See East and Scott (2011).

Students' motivation to learn

No account of the impact of NCEA on school and teacher curriculum thinking and decision making would be complete without a short discussion of the issue of student motivation and engagement in their learning. In a 21st century view, learner motivation is not just about being persuaded to work hard and get ahead. As the following comments highlight, students must be active partners if their learning is going to fully engage them as persons, and motivate them to make their very best efforts, and to want to keep on learning of their own volition:

To learn, people have to be *actively* engaged—they need to be *doing* something, *thinking* something, and/or *saying* something that requires them to actively process, interpret and adapt an experience to a new context or use. (Bolstad et al., 2012, p. 12)

This does not mean that there are not important things to learn about. It would be a foolish person who claimed that the knowledge that constitutes the traditional basis of the curriculum is no longer valued. However:

Learners have to *want* to learn the material. They have to be able to see a *purpose* to learning it—both in the short term, and in the longer term sense of seeing how learning this material will allow them to contribute to something beyond themselves. (Bolstad et al., 2012, p. 12)

Looming examinations, and the need to gain qualifications to keep learning pathways open, have traditionally acted as a powerful extrinsic motivator to which teachers can appeal. However, the justification that a certain aspect of learning is important “because it could be in the exam” will not necessarily foster the sense of engaged and personalised learning suggested by the quote above. Nor has this type of extrinsic motivation translated particularly happily into the NCEA context, where the “carrot” of gaining credits for learning effort expended has been over-used in ways that can backfire when students begin to pick and choose which assessments they will attempt, on the grounds that they can foresee a surfeit of credits accumulating. Learning Curves reported a rapid escalation of internal assessment events as teachers sought to maximise students' chances to gain credits in the early days of NCEA. Some students were gaining double and treble the numbers of credits they actually needed to gain their NCEA award. Again, the Competent Learners research endorsed this finding in a much wider range of schools. Not surprisingly, complaints about the amount of learning time taken up in assessment quickly became common. The obvious impact of so much assessment on teachers' workloads added to the pressures they were feeling.

It is important to note that the issue of overassessment, and excessive credit gathering, is not necessarily only about motivating students to work harder. How purposes for learning are understood also comes into play. If learning is understood to be primarily undertaken to gain a qualification, and that learning is seen as entailing curriculum *coverage* so the necessary

content has been acquired, then teachers may be reluctant to omit standards from a full suite developed for their subject, even if they can see the practical sense in doing so.¹⁹ Parents and students are likely to hold similar beliefs to teachers on these matters, and in all cases these beliefs are likely to be tacitly held rather than explicit. Until they are brought into the open and widely debated, this will be a difficult set of assumptions and practices to shift.

Once NCEA had bedded in, in response to ongoing debate about whether or not it offered sufficient extrinsic motivation for all students to achieve to the best of their ability, NZQA changed an aspect of the qualification's design to allow for endorsement of standards. Instead of simply being awarded, or not, records of achievement could now acknowledge achievement that had shown merit or excellence. This change, with its echoes of familiar "A, B, C" passing grades, met widespread approval and media-driven opposition to NCEA quietened down.²⁰ Endorsement of whole courses quickly followed.

Notwithstanding this evident success, we could argue that this change supports existing thinking about learning and motivation, and thus could constitute a lost opportunity to ask critical questions about how to foster greater intrinsic motivation of learning. This is an especially important question given the NZC focus on fostering a lifelong engagement with learning in each and every citizen. However, as the students' comments in the first of the case studies make clear, there is a tangled relationship between extrinsic and intrinsic motivation. Given the right learning conditions, success initially driven by teacher energy and commitment can turn to real engagement with learning on the part of previously reluctant students.

The research process in the schools

As outlined above, research points to four specific, interrelated types of challenge for schools' and teachers' curriculum thinking and decision making. These are: innovating course structures; rethinking how best to address the specific needs and abilities of all learners; refocusing the purposes to be served by the learning on offer within traditional subject areas of the curriculum; and rethinking issues of engagement and motivation to learn. The current project sought to explore these challenges as an interrelated set. Undertaking a small number of case studies allowed us to explore all these challenges in the context of the contributing teachers' schools and work. The short case studies that follow are exploratory rather than evaluative. Each describes a different type of innovative practice, in which the school identified a specific type of learning need and responded to this.

¹⁹ The relationship between views of motivation and views of purposes for learning was discussed in the first of the NCEA-specific reports from the NZCER National Survey of Secondary Schools (Hipkins, 2007b).

²⁰ In 2009, 96 percent of principals and 90 percent of teachers who responded to the NZCER National Survey of Secondary Schools saw endorsement of achievement standards as a worthwhile change to the qualification (Hipkins, 2010).

In two of the three schools we talked to teachers and students involved in the innovation. We wanted to know about the change itself and what motivated it. We were interested in successes and challenges, from both the teachers' and students' perspectives, and in what teachers thought they would take forward into their future NCEA decision making.

The completed case studies were returned to the schools for comment and the school names are published with the teachers' and principals' consent.

2. Innovation that supports success for vulnerable or aspiring students

Section 1 noted that both NZC and NCEA share the intent to maximise flexibility and autonomy for schools as they put together learning programmes that meet the needs of *all* their students. The case study outlined in this section is set in a very particular set of circumstances that made some students even more vulnerable to not succeeding at school than they might already have been. Hagley Community College is located in the heart of the Christchurch urban area. Like so many schools in the region, the school leaders applied considerable creative thinking to the delivery of flexible education programmes in the somewhat chaotic post-earthquake context that unfolded in early 2011. This section documents four different types of courses offered at the school in 2011.

The Fresh Start initiative

The series of earthquakes in the greater Christchurch region that began in late 2010 and intensified in 2011 displaced a number of vulnerable young people from their employment or from the education system. For the school in this case study the “straw that broke the camel’s back” was the June 2011 earthquake, after which a large number of young people left school. In response, Hagley Community College in Central Christchurch designed a programme of learning that offered the opportunity to return to school to complete a Level 2 NCEA Certificate. They called this programme Fresh Start.

Students entered the programme for different reasons. Some had their eye on new job opportunities that required Level 2 NCEA. Some were unable to enrol at other schools that restricted new enrolments as they coped with earthquake damage (or, if relatively undamaged themselves, accommodated more severely affected schools in site-sharing arrangements). For others the flexibility of part-time study fitted well with their work

commitments. Some said the attraction was that the course was free, and for older students this programme offered a way back into the education system. In the event, the length of the course (22 weeks from May until November) was unsustainable for many students. Other commitments such as childcare and part-time jobs or just lack of commitment resulted in a 50 percent dropout rate. The programme co-ordinator suggested a more suitable length for the course in future would be 15 weeks.

Flexibility in delivery was seen as an important aspect of meeting the learning needs of these vulnerable young adults, who had a median age of 20. Most subjects were taught in the afternoon, from Tuesday to Friday, and lessons did not conclude until 5.00pm. Each subject was taught in two blocks of 2.5 hours and students were able to choose the number of subjects they could manage within their personal time constraints.

Initially the school envisaged that achievement standards would provide the means of assessing the planned learning programme. The course criteria required students to be working at an “appropriate academic level” but the teachers quickly found that the ability of some students who enrolled was lower than expected, particularly in mathematics. Also, the self-management, work and study skills of the students accepted into the course were not at the levels anticipated, although for those students who did persist, these quickly improved with support. In response the teachers working on the course designed more manageable schedules of assessment, weighted towards unit standards and more practical achievement standards in PE, English, mathematics, science and tourism. They knew it would be important for these students to experience some quick successes, if they were to keep them attending and engaged.

For the teachers, this was a very intensive experience. They worked hard to adapt their courses to meet the students’ need to stay engaged and experience success. It was clear to us that deep expertise in their respective subjects helped them to select unit standards that they knew would interest and motivate these young adults, and to quickly adapt their courses around these. For example, the PE teacher chose a unit standard that looked at psychological skills in a sports setting, which allowed him to address issues of motivation and goal setting early in the course.

Both the teachers with whom we spoke were clear that the programme priority was not gaining credits per se, but rather using this carrot to help students see that they can be successful learners. In the words of one teacher:

They are not academic and can be pleasantly surprised by what they achieve.

Students who remained in the course told us they were rewarded not only with achievement but also with increased self-esteem. They particularly enjoyed the adult relationships they developed with their teachers and the fact that they achieved credits quickly. They also liked working in intensive but carefully paced 4-hour blocks of time and the fact that assessment occurred when they were ready for it, not to some predetermined schedule.

The Step Up initiative

Although the Fresh Start course was a very specific response to a particular set of circumstances, Hagley Community College has an established tradition of working flexibly with young adult learners. When we were visiting to learn about Fresh Start we also documented several other courses that demonstrate the flexibility that NCEA affords to build programmes around the needs of learners (which is the first of the five future-focus principles outlined in Section 1). One of these was the Step Up initiative.

Universities have taken advantage of endorsement of achievement standards to tighten entry criteria, especially where there is competition for entry into restricted courses. Two, three and four points are awarded for the grades of achieved, merit and excellence respectively. Students now require merit and excellent grades in as many standards as possible to gain the 120 points at NCEA Level 3 that now constitute the minimum for acceptance into university courses. The Step Up programme, introduced in 2011, was designed to support students who are a few points short of the required total, or who need to make a within-subject total up to 14 credits to meet university entrance requirements, or to assist students who had taken a “gap” year and now found they had insufficient credits to enter university (because, pre-endorsement, they did not have the opportunity to top up with merit or excellence additional credits). Some earthquake affected students were also included in the target group. These were young people whose jobs had disappeared in the aftermath of one or other of the earthquakes, and who now wished to try their hand at NCEA, with a view to going on to university. (Some of this group came with no NCEA credits initially, yet were very successful in their studies.)

The Step Up course runs for 12 weeks in the second half of the school year and is aimed at helping students to gain merit and excellent passes. The various classes take place as 2-hour blocks held consecutively in the afternoon and early evening. Teachers told us this type of learning is very intensive for them and for students. Every 2 or 3 weeks the class has covered sufficient ground for assessment for an achievement standard. Because the students have mostly already achieved these standards the aim of the re-learning is to “move the bar up to merit or excellence”.

For the teachers, this course entails careful attention to the pedagogy they use, with a particular focus on addressing student misunderstandings. One teacher noted how challenging this type of pedagogy could be in a rapidly paced learning context. She needed to be very strategic in finding out what students knew and could do, even as the actual teaching continued apace. She said doing this was made possible by “strong knowledge of the curriculum”. One strategy she had used was to ask students to bring in their previous attempts at assessment for specific standards, so she could quickly diagnose aspects of learning where they might have struck trouble, or simply needed to be extended and lift their game. Both teachers to whom we spoke make a specific point of assessing students’ work as soon as they can after it has been completed, so that feedback is timely and pace is maintained. At times this could be pressured for them, but it was something they were

committed to doing and they were well aware of its impact on keeping students highly motivated.

The students said that they liked the intensive course structure, even though it was challenging to cope with:

The intensity is a challenge, but good for personal growth.

The pace increased my sense of the need to be responsible and invest. Once I understood this I learned to pace myself.

One student had come into the course needing 14 credits in history. At the time of the interview he had already achieved 21 credits and was in the process of making a strategic decision about how many more he would try for before the end of the course.

These students enjoyed very positive relationships with the teachers, and high expectations were the norm. Their learning was personalised and they were very appreciative of the specific “next steps” feedback that came with their assessed work. One older student noted how much more thinking was demanded of her than in any of her previous learning experiences. Like the Fresh Start students, many of these learners had surprised themselves (we heard this phrase a lot) with what they could achieve and had achieved. One student made the observation that a sort of virtuous spiral was in play:

The teachers invest more because we are so focused.

Catch-up College

Hagley Community College has also designed a third type of programme called Catch-up College. This programme is essentially a “summer school”. It supports students who are just short of a few credits to reach the total needed to enter university. From 2006 to 2009 this programme offered short courses in January and February to allow students to meet university entry requirements and be eligible to enrol in the first semester. However, in 2010 university entrance requirements changed and students who had not gained entry requirements in the final exams of the previous year could not enter any university until Semester 2. In response, Catch-up College changed that year from an intensive programme of very short courses to one that ran in several subjects during after-school hours, on a weekly basis until May (6 May being the deadline for Semester 2). Canterbury University student numbers have declined after the 2011 earthquakes and from 2012 the university has again accepted student enrolments for Semester 1, including those who are still completing Catch-Up programmes. In response, the 2012 Catch-up College reverted back to intensive short courses in January and February. These courses were not running at the time of our visit so we were not able to speak to any of the students.

Establishing a School of Music

The School of Music is “a school within a school” and is envisaged as an “academy” type of programme. At the time of our visit to Hagley this was being planned as a new initiative for 2012. The intent was to provide an academic programme of NCEA qualifications at Level 2, and a Level 2 National Certificate in Music, for students who have disengaged from their education and/or for whom music is the only thing they want to do. The programme is designed to provide a pathway for the students into music studies at Christchurch Polytechnic Institute of Technology (CPIT).

Students will be able to enter the course from Year 10 or Year 11, or as mature students from inside or outside the college. They will need to have good music skills and be able to play an instrument to a competent level and read music. They must also be seen to be willing to commit to a full-time music course and pass an audition/aural test.

The programme offers 42 to 43 NCEA credits derived from achievement standards in music, along with 20 credits from English and 20 credits from mathematics (four standards each). There is flexibility to select either Level 1 or Level 2 standards to accommodate the different year levels at which students enter. Those who demonstrate the ability can strive for Level 3 credits in music, additional Level 2 credits in mathematics and English or credits from another subject if desired. The course also allows for some students to gain their NCEA Level 2 credits over 2 years. From 2013 a Year 13 course will be introduced.

Achievement in music is the focus, but music is also the context for learning in the other subjects. For example, aspects of English might draw on the history of Rock’n’Roll or the biography of a popular musician such as Kurt Cobain. Mathematics learning could include budgeting for the production of a compact disc, travel times for touring and statistics about audience.

Getting this programme up and running has required passionate commitment from teachers who want to see the selected students succeed. In 2011 these teachers fundraised to acquire the resources they would need. Those who volunteered to teach English or mathematics on the programme also have an interest in music.

Year 11 Academic Initiative

The fifth type of initiative we documented during our visit to Hagley Community College is not a course-based initiative in the sense of those already outlined, but rather applies to students at risk of underachievement in Hagley’s mainstream Year 11 courses. In common with the above initiatives, the strategy briefly outlined next is intended to support vulnerable students to experience success and hence to remain engaged in a productive learning pathway that meets their needs.

In 2011 the requirements to meet the literacy and numeracy components of NCEA awards changed. Students whose achievement is mainly assessed with achievement standards can now gain the literacy and numeracy credits they need simply by gaining standards in other subjects that require them to demonstrate these competencies. They might, for example, gain literacy credits from an extended piece of writing in another subject that requires them to develop a written explanation or argument. For lower achieving students, new suites of unit standards have been developed for the purpose of awarding credits for competency in literacy or numeracy. These unit standards also draw on “naturally occurring” evidence (i.e., evidence generated in other courses and tasks) but they are not awarded automatically: someone must decide if a specific piece of work is up to the standard specified by the relevant unit standard.

The school has put together system-wide processes to leverage opportunities opened up by the introduction of these unit standards.²¹ The initiative has a specific focus on ensuring that Year 11 students at risk of not achieving sufficient credits to be successful in NCEA are offered every chance to gain credits from the literacy and numeracy standards. At the same time the process followed leverages professional learning opportunities for the teachers of these students in their subjects other than literacy and numeracy. By working with experts to assess promising pieces of student work, teachers from other subjects learn more about the literacy and numeracy challenges their students face, and develop a more proactive sense of areas where students might need explicit support so that their literacy and numeracy skills enable rather than hamper their other learning.

Reflections on these systems/programme initiatives

One of the original purposes of NCEA was to allow for assessment to occur when students were ready, rather than as the conclusion to a time-serving standardised learning schedule. The senior management team at Hagley Community College are very conscious of the need to challenge assumptions that underpin calendar-year timing for courses and “one size fits all” course offerings and assessment plans. All the above examples show that NCEA can indeed allow for flexible *timing* of teaching and learning, and especially of assessment. The mix and design of courses change responsively on a year-by-year basis and sometimes within a shorter time frame if the need arises, as with the Fresh Start programme.

There are, however, some potential impediments, not least of them the process used for funding the operations grant to schools. It will be evident from the above descriptions that offering a suite of flexible courses could lead to considerable roll flux. Students move in and out of courses as *their* needs dictate—they are not necessarily in attendance for the full school year. One of the senior management team noted that, on balance, “roll replenishment” (i.e., new students arriving as others leave) did tend to keep numbers up so

²¹ A detailed description of how this system works within the school can be found in Hipkins (2012a).

that “compliance aspects” (i.e., maintaining the roll numbers for which the school is funded) generally took care of themselves once innovative courses were up and running. Nevertheless, it takes a confident leadership team to trust that the numbers will work out.

Juggling their staffing resource is another challenge that rests with the senior management team. At least one of the teachers with whom we spoke works flexibly across a portfolio of roles in different schools, but most of the teachers were full-time employees who were prepared to work the irregular hours entailed in these innovative courses. Their commitment and drive were just as important as those of the senior management team. The manner in which they personalised learning “on the fly” placed a high expectation on them as individuals. However, teamwork and high trust between collaborating colleagues were notable features in their management of these pressures.

It is clear that high expectations of students’ abilities underpin all these flexible courses. They are designed to work around students’ life constraints, turning these into opportunities to the extent that any school programme actually can. The students we spoke with were very positive and grateful for their second chances. Their new-found abilities took them by surprise and fed their commitment to further study, or to specific employment goals.

The 21st century principles of personalising learning, working with the diversity of students entering the school and creating strong learning partnerships between teachers and students were particularly in evidence in these courses at Hagley Community College. With the exception of the Music School, which was still at the planning stage when we visited, what we don’t necessarily see in these examples is future-focused curriculum thinking, where the role that knowledge plays in learning is rethought. We knew when we arranged the visit that this was not the sort of innovation we would be investigating. This comment is not meant to imply it is not happening in the school. However, the huge amount of energy that the school had invested in planning and running these courses responsive to students’ practical learning needs begs the question of just how much innovative thinking one school, as a whole collective, can cope with at any one time. The next case study, which does document a shift in teachers’ curriculum thinking, is set at the scale of change with one faculty team.

3. Innovation enabled by the recent NZC–NCEA alignment

The recent review of achievement standards to better align them with NZC has brought about changes to the standards used to assess history as a subject under the umbrella of the Social Sciences learning area. The existing suite of achievement standards for history has been reworked to place the main emphasis on various competencies needed to demonstrate *historical thinking*. This shift of emphasis does not replace content. Considerable effort is entailed in historical thinking²² and this effort should be directed towards something that matters (i.e., a topic of substance and relevance). But the focus on assessment of competencies does make space for a much wider choice of content/contexts to explore during the learning and requires teachers to think deeply about the *purposes* served by learning their subject.

The case study outlined in this section describes course changes made by the history teachers at Wellington East Girls' College (WEGC) in response to the changes to the NCEA Level 1 history achievement standards.

Redesigning the history course at Level 1

Teachers at WEGC have experienced the shift of assessment focus from coverage of history content to demonstration of competencies as a liberating change. Specific competencies that they discussed with us included perspective taking, values clarification, resource analysis and evaluation of evidence in order to build a reasoned argument in response to a specific investigative question. The emphasis on demonstrating these competencies affords much

²² History educator Sam Wineberg has famously called historical thinking an “unnatural act” because of the effort it takes and the careful scaffolding that students need to experience if they are to learn to do it well (Wineberg, 2001).

more freedom to choose topics that will provide the contexts and substance for students' explorations:

The old curriculum is so boring. Teachers are over it. The new standards say 'this is what we want you to teach' but you choose the resources, the context—the literature, the artwork, the historical people through time: what you use is up to you.

The freedom offered by the revision of the achievement standards prompted a comprehensive rethinking of the teaching programme at Year 11. WEGC students choosing Level 1 history are now offered a course that is assessed by three internally assessed and two externally assessed achievement standards. By contrast, the previous emphasis was on external assessment, with content coverage central to learning and preparation for these assessments. Previously, a chronological accounting of historical events would constitute a typical approach to a topic:

We used to have to get from 1919 to 1941—all the perspectives and when everything happened—because that was how it was set down.

When we visited in late 2011 the teachers said that their new course was more purposeful and they were able to teach skills that an historian would actually use in the process of building new historical knowledge. The focus had shifted from training for assessment to thinking critically about how history is made. This new emphasis allowed students to make more personal choices in the contexts with which they worked, the readings they selected and the ways they presented their individual research efforts.

The teachers noted that assessment tasks were still similar to those they might have used previously. For example, resource analysis and essay writing were still seen as important. But the assessment emphasis had shifted to the competencies that students build and strengthen *throughout* the year as they use them in different contexts, for different purposes and with different constraints. With the new emphasis on assessment of competency, students might choose to “follow an idea around” during the year as they developed the different aspects of competency assessed by the different standards. Or they might choose a new topic. (The freedom of choice in contexts allowed students to pursue different historical events from each other when completing individual research assignments.) The teachers said this freedom of choice allowed them to learn from their students' research, which they clearly found stimulating. Examples of the sorts of questions students investigated for their research projects included:

- What effects did WWII have on perceptions of New Zealand masculinity?
- What was the legacy of the Titanic disaster for those involved?
- How did the bombing of Pearl Harbour relate to America's Pacific war?
- How successful was the Chinese Cultural Revolution in eliminating the “Four Olds”?

The teachers noted that each achievement standard now had just one criterion against which students would be assessed. This sharper *focus* in each achievement standard had changed the nature of their assessment decision making. They said that the judgement now required was holistic rather than atomistic (where separate pieces add to a whole). This meant that their students could demonstrate their real strengths, where previously they might have lost marks for things they were not good at. They noted that the “little details” (e.g., accurate use of full stops) are no longer as important. What really counts are the qualities demonstrated in the aspect of historical thinking being assessed. Positive feedback to their assessment design from NZQA’s moderation processes added to their confidence that they were on the right track with their curriculum thinking.

The teachers said that this change had been very motivating for students and they were now achieving “much better results” in the internally assessed standards. The most able students had space to really excel and were motivated to do so. Furthermore, the students’ newfound confidence and skills, bolstered by their strong interest and evident success in the internal assessments, had flowed through into their external assessments, and they were seeing lifts in achievement there as well.

The students said that they found the course “just challenging enough” and they really enjoyed being able to do things such as exploring different perspectives on a situation. They enjoyed the group work and class discussions and were aware that their teachers were working really hard to keep them engaged. Furthermore, they could see value in their learning beyond the immediate challenge of achieving a specific standard:

When I don’t understand something I can look at the problem in a different way—see it from other angles.

History it is about understanding/more depth. Having taken history will help us understand other people’s opinions and why people do things, and maybe see the consequences of something we were going to do.

One caveat to these evident successes relates specifically to teacher knowledge and curriculum thinking. The teachers noted the importance of keeping a very clear focus on what it means to think historically, so that they did not inadvertently revert to more traditional modes of curriculum coverage where “the teacher tells you everything”. As a team they had needed to draw on strong disciplinary skills and they were concerned that beginning teachers, and some more traditional teachers, might not be able to adopt these approaches without additional support.

The evolving Years 9 and 10 social studies programme

How was it that these history teachers were so open to changing their teaching and learning programme as soon as changes in the achievement standards made it feel safe to do so? To

answer this question it is necessary to briefly outline some of their prior experiences of different curriculum thinking, and their previous experiences of curriculum change, which had related to working with Years 9 and 10 students.

During our visit the head of department (HOD) noted that her team was attuned to making changes in their learning programme well before the NZC–NCEA alignment process produced the updated Level 1 achievement standards. The previous HOD had used her work as a context for trying out ideas sparked by her postgraduate study and the teachers were used to exploring ideas and thinking about their implications for practice. One of the teachers noted that their change journey had actually begun by looking at how they were assessing social studies:

We thought ‘this is not working with our teaching’. So we started with assessment. Then we changed the teaching, and then we changed the assessment some more.

It became obvious that often assessment was about learning to read instructions rather than assessing their strengths—showing what they can do.

The junior classes are also taught by teachers from other social science disciplines so they all needed to work together to reach a common understanding of what the new approaches would entail, as translated into the junior school. Because the ideas were debated across the whole social sciences team, who have different disciplinary backgrounds, the teachers needed to carefully discuss “big-picture” goals for learning. Doing this allowed them to reach a shared understanding across disciplines, and to ensure that the skill development they now foregrounded would be carefully scaffolded to develop and be extended across Years 9 to 13.

In place of the previous detailed lesson-by-lesson unit plans, dominated by content, the team has developed term-by-term teaching and learning frameworks (TLFs). The full set was developed over a period of time. A different teacher took responsibility for each TLF and for writing the associated assessments. The HOD said that during the process the team had needed to do some “letting go” of content coverage for its own sake. Exploring the front half of NZC had helped frame these discussions.

Each framework begins with a rich question based on one or more of the Level 5 social science achievement objectives and the social inquiry process.²³ The skill focus is developed through inquiry-based learning. During 2011 these frameworks were refined and their use extended to the whole department.

The teachers said that these changes had meant that they were now more focused on the messages about learning priorities conveyed by the front end of the curriculum. This shift was reflected in changes in the teaching materials and pedagogies they used. Both the

²³ MOE has recently produced a booklet that supports a “social inquiry” approach to learning, as outlined in NZC (Ministry of Education, 2008).

assessment and teaching emphasis shifted from content coverage to the development of competencies. As in the senior school, students can now choose the contexts they want to explore, select their own resources and evaluate the resources and their own thinking from their initial assumptions.

The history teachers felt that it had been important to make these changes in order to prepare students for the new emphases of the senior programme, and specifically the new NCEA standards.

Reflections on iterative curriculum change

This case study reflects characteristics of change that were also evident in the Curriculum Implementation Exploratory Studies (CIES). Schools that were “early adopters” of NZC already had a culture of active professional questioning and learning together before NZC arrived.²⁴ This same dynamic was apparent in the WEGC social sciences/history teaching team. As in the CIES schools, successive team leaders were highly engaged curriculum thinkers who created space for others to think with them to develop a “big-picture” vision of the enacted curriculum.

It is also evident that these history teachers (and no doubt many others like them) had the confidence, knowledge and skills to treat the newly aligned achievement standards as “enabling constraints”. They still structured their courses around these important assessment targets, but took up the freedom to think more creatively about how best to develop and extend students’ historical thinking skills, to allow students to choose different contexts in which to explore important “big ideas” and to demonstrate their competency development over time.

The case study also illustrates the *recursive* nature of change. Teachers think through an idea, try it out, see what happens and make further changes in response to what actually unfolds. NZC explicitly supports such engaged professional inquiry, and again this was also a feature of the change dynamic in the CIES schools, particularly as they got to grips with the key competencies that were the most evidently novel aspect of NZC.²⁵

The curriculum/assessment focus on competency development outlined in this case study illustrates one way of manageably personalising the curriculum, which is the first of the 21st century principles outlined in the introduction. There are also indications of a shift in roles, with students taking more responsibility for their learning and teachers learning from and with their students. We have evidence from other NZCER research that a pedagogical focus

²⁴ For more detail, see the CIES report from the conclusion of the first round of this research (Cowie et al., 2009).

²⁵ For an explicit discussion of what such recursive change looked like in the CIES schools, see Hipkins and Boyd (2011).

on competency development is very engaging for students²⁶ and this sense of engagement was evident in the students with whom we spoke at WEGC. They wanted to be challenged to think about and debate matters of substance and importance in their lives. In this way, greater intrinsic motivation can be fostered and the gaining of NCEA credits is put into its proper perspective as a means to future ends (via qualifications gained), not just an end in itself to motivate current learning.

These reflective comments beg the question of how more isolated teachers (those who are sole teachers of their subject in their school, or who do not enjoy the same engaged and challenging professional learning conditions) can best be supported to shift their curriculum thinking. The teachers at WEGC were certainly aware that others might struggle to make the big shifts that had worked so well for them. Clearly, changes to the history achievement standards can enable curriculum change, with associated shifts in pedagogy, but the standards cannot do the job alone, any more than a changed curriculum can.

²⁶ Data gathered from the longitudinal Competent Learners project show very clear differences between students' sense of engagement in classes where competencies are expanded and those where they are not (see Hipkins, 2012b).

4. Innovation with an explicit focus on students' futures

As previous sections have shown, changes to, or new developments in, achievement standards can draw critical attention to the *purposes* for which a subject might be studied. Debates prompted by assessment-driven messages about what is important to teach and learn might then lead to changes to classroom pedagogy. But is NCEA sufficiently flexible to allow the reverse chain of influence to also enable change? What if a teacher has thought deeply about purposes for learning their subject, and is determined to make innovative changes that are not yet clearly reflected in the achievement standards for the relevant discipline area? Is NCEA sufficiently flexible to accommodate the cutting-edge curriculum thinking of such a teacher while still catering to majority (traditional) views of what the learning area is about?

The case study in this section explores this possibility, and its attendant challenges. It adds to the picture of the relationship between NCEA and innovative curriculum thinking by identifying some potential barriers that can stand in the way of teachers who aspire to work at the frontiers of a 21st century curriculum.

The nature of the NZC–NCEA alignment challenge in science

The NZC *Essence Statement* for the science learning area conveys a forthright message about *why* science is an important school subject for all students to study:

In science, students explore how both the natural physical world and science itself work **so that** they can participate as critical, informed, and responsible citizens in a society in which science plays a significant role. (Ministry of Education, 2007, p. 17, emphasis added to highlight message about purpose)

Arguably, *science-informed competencies* that students take into their future lives are highlighted here. The implication is that content learning in science is a means to other important ends and should not be seen as the sole, or even the main, end in itself. This future-focused interpretation is consistent with the NZC vision for students to become “confident, connected lifelong learners” (Ministry of Education, 2007, p. 8), with the *future focus* principle and with the identification of the NZC key competencies as “capabilities for living and lifelong learning” (Ministry of Education, 2007, p. 12). Such an interpretation is also consistent with leading international thinking. For example, the draft framework that underpins the Organisation for Economic Cooperation and Development’s (OECD’s) International Programme for Student Assessment (PISA) is structured around scientific competencies for future citizenship.

Traditionally the de facto purpose served by science has been to sort students for ongoing study and to ensure a supply of future scientists.²⁷ Coverage of content has been the main focus for both assessment and pedagogy, and this emphasis is still predominant in many of the achievement standards for the various science disciplines, notwithstanding their recent alignment to NZC. This is not to suggest that those working on the alignment process acted with anything other than the best of intentions. As a framework document, NZC is open to a range of interpretations: the structure of the science learning area, with its overarching Nature of Science strand, has very particular and complex interpretation challenges.²⁸ Strong curriculum leadership, at a national level, is needed to address these complex challenges of curriculum interpretation and enactment.

While there are many resources that could potentially support science teachers to shift their practice, the full range of these does not appear to be widely accessed. For many secondary science teachers NCEA standards and accompanying materials are currently their most-used (or only) *curriculum* resource.²⁹ The alignment of the NCEA standards to NZC was largely delegated to leading teachers and some of the innovations initially proposed were reversed following negative feedback from other teachers. The overall process did not successfully create the space and curriculum leadership needed for debate about the multiple implications of a curriculum that now has a 21st century framing. With hindsight, it was perhaps inevitable that the “aligned” NCEA standards still do not clearly and unequivocally reflect the 21st century shifts implied by NZC. However, as we next outline, some wiggle room is indeed possible when teachers are motivated and able to think creatively about the structure of courses, in combination with critical reflections on the purposes for their work.

²⁷ In fact there are four broad types of purposes for science learning. These were recently summarised and discussed in the report *Inspired by Science* (Bull, Gilbert, Barwick, Hipkins, & Baker, 2010).

²⁸ These are discussed at some length in Hipkins (2012c).

²⁹ The results of a recent online survey of teachers’ use of science resources can be found in Hipkins and Hodgen (2012).

Preparing students to be science citizens

At Newlands College, Year 12 students have a choice of four science courses. The physics, chemistry and biology courses are still relatively traditional in structure but a new science issues course, offered for the first time in 2012, is different. This course has been developed by the Head of Faculty (HOF) for science with the future-focused NZC emphasis in mind. It was explicitly designed to improve students' scientific literacy so that they can be better prepared as future citizens of the 21st century. This third case study first outlines the structure and focus of the course, describes challenges faced when attempting this type of innovation and discusses the HOF's thinking as the course was being created.³⁰

A new course structure

The first challenge the HOF faced was to ensure that she could design a fully assessable course that enabled the planned learning to foreground issues rather than content. Since most of the achievement standards in her own discipline area (biology) still foreground content, she knew she would need to draw more widely across the various science domains. As the table on the next page shows, she was able to do this with a little creative juggling, and some negotiation with other members of her team, because each standard can only be offered within one of the courses.

The science issues course is structured around five different contexts, each of which explores a current socioscientific issue of relevance to New Zealand students and their lives. The course is assessed using four internally assessed Level 2 achievement standards, worth 17 credits in total, and one externally assessed achievement standard worth 4 credits.³¹ These standards have been drawn from the four domains of Agricultural/Horticultural, Education for Sustainability, Biology and Earth and Space Science.

³⁰ At the time the fieldwork was conducted, early in 2012, the course was too new for us to hold meaningful focus group conversations with students enrolled in the course.

³¹ This is an important detail. Unless at least one of the standards is externally assessed, NZQA will not approve a course for merit/excellence endorsement. Higher achieving students could be disadvantaged without this option.

The structure of the science issues course

The topic description given to students	Achievement standard	Credits
Wasted Waterways A look at how farming impacts on the waterways of the area.	Agriculture/Horticulture (AS91298): Report on the environmental impact of the production of a locally produced primary product.	4
Making a Difference Choose your own personal action either individually or in a group, which will contribute towards a sustainable future. This is an extended project, over two terms.	Education for Sustainability (AS90810): Plan, implement and evaluate a personal action that will contribute towards a sustainable future.	6
Paradise in Peril New Zealand is a user of the chemical 1080 to try and control pests. How is information conveyed to the public, on both sides of the argument?	Biology (AS91154): Analyse the biological validity of information presented to the public.	3
Life on Mars When Earth becomes too small to sustain human population growth, is Mars a viable option?	Earth and Space Science (AS91190): Investigate how organisms survive in an extreme environment.	4
Shake, Rattle and Roll NZ is affected by a number of types of extreme Earth events—earthquakes, volcanoes and tsunamis. Here we will learn what causes all of these events.	Earth and Space Science (AS91191): Demonstrate understanding of the causes of extreme Earth events in New Zealand.	4

Notice that the title chosen for each unit within the course is designed to draw students' attention to the overarching issues theme. By contrast, in many course descriptions we have seen, the title of the topic is the title of the NCEA standard used to assess that topic/unit of work. The brief explanation has been shaped to convey the relevance of each topic and to direct students' attention to future problems and "what if" questions. These choices were quite deliberate. The HOF was determined that the NCEA standards would serve the planned learning, not vice versa.

As already noted, the HOF was determined that the assessment tasks she designed would reflect the learning she envisaged rather than drive it. She deliberately designed her own summative tasks *before* she looked at the assessment tasks provided by NZQA for the purpose of illustrating the scope and intent of each new standard. She said that 2012 provided a "window for experimentation" because moderation feedback would not be available until after the fact of the completed assessments. Thus the 2012 students would not be disadvantaged, even if she pushed the boundaries of the interpretation of a new standard. Her hope was that she could open up a space where she and other teachers could debate how to make the standards work better to the curriculum. Her plan was to voluntarily submit her assessment plan and tasks for moderation, partly for reassurance that the planned work

would be acceptable in 2013, but mainly in the hope of contributing to the thinking of NZQA's moderators about what might be possible within the scope of the new assessment specifications.

Issues for further consideration

The HOF said it was important to hold high expectations for all students. She did not support the use of lower level unit standards to create alternative but essentially dead-end courses for students who might struggle with more traditional science courses. The science issues course was intended to provide one rich and challenging option for students who did not necessarily intend to continue on to university at the end of Year 13. Even if they stopped studying science at the end of Year 12, the HOF's aim was that students who completed this course would take a set of important scientific decision-making competencies away from school. She wanted the students to become increasingly confident that they could use these competencies whenever socioscientific issues touched their lives. If they did decide to stay in science in Year 13 (perhaps as a result of experiencing such an engaging Year 12 course) her intention was that students could choose either an equivalent Year 13 science issues course or move across to Year 13 biology.

However, a Year 13 science issues course structured in the same way as the Year 12 course would cause problems for students who might by now have decided that they *would* go on to university after all.³² The requirements for university entrance specify that students must gain 14 credits in each of two domains, and 14 more credits spread across two additional domains. This requirement is most safely met by choosing courses that are each confined within a single domain. This means that, for university-bound students selecting a science subject, the least risky course of action is to accumulate all the necessary credits within one science domain. However, the achievement standards in the course outlined above cover four domains (Biology, Earth and Space Science, Agriculture/Horticulture and Education for Sustainability). A Year 13 issues-based course designed to the same structure as the Year 12 one would allow only eight credits to be counted for university entrance (as shown the above, this is the maximum number available in any one domain—in this example, Earth and Space Science). The HOF was already thinking creatively about ways to overcome this problem. She had in mind a Year 13 course that included a higher number of Earth and Space Science achievement standards, but concrete decisions still lay in the future at the time of our visit.

Another important risk is that students might gain university entrance but not accumulate a sufficiently high credit total to gain a place in a course where there is competition for those

³² Students who chose this course alongside a more traditional science option would face the same issue. As a matter of principle, developing the competencies to engage with socioscientific issues is just as important for those who plan to embark on science-related careers as it is for everyone else—and in some circumstances arguably perhaps it is even more important.

places. Section 2 has already addressed this issue: it was one of the drivers behind the design of Hagley Community College’s Step Up initiative. The HOF knew that students who opted into the issues course would be more likely to flourish as they gained the confidence that comes from early achievement in internally assessed units. Furthermore, the sorts of learning outcomes on which she wanted to focus are more appropriately assessed by “authentic” tasks, not examination-style pen-and-paper assessment events. To stay true to her purposes, the emphasis needed to be on internal assessment. Even so, in order to keep open the possibility of certificate endorsement (and the additional credits that students gain from either a merit or an excellence pass in a standard) the HOF had searched for one external standard that would best fit the intent of her course. With some reservations, she chose Earth Events in New Zealand, and the plan is to use this to assess the final unit of the course. While the issue is not as acute at Year 12, university-bound Year 13 students taking a course structured in this way would have a lot riding on that one external standard. If they did not gain it, no matter how well they had done in their other units, they would not be eligible for the higher credit totals that come with achievement at a merit or excellence level.

Reflecting on structures and incentives

The technical challenges faced by this HOF when designing an issues-focused pathway through the senior sciences are unfortunate consequences of NCEA specifications and university entrance regulations that are in themselves understandable—indeed defensible—in a certain curriculum framing. It *is* important that students experience coherent courses of learning. One of the eight NZC principles for curriculum design explicitly addresses such coherence:

The curriculum offers all students a broad education that makes links within and across learning areas, provides for coherent transitions, and opens up pathways to further learning. (Ministry of Education, 2007, p. 9)

No doubt the university entrance regulation concerning the spread of credits across courses was intended to ensure such coherence by preventing “cherry-picking” of an ill-mixed assortment of standards for the purpose of gaining easy credits.³³ However, the regulation rests on the assumption that coherence necessarily resides *within* a specific body of disciplinary knowledge. But this is not the message that NZC conveys: the principle cited above is explicit that meaningful connection must also be made *across* learning areas. There is nothing to stop teachers making such connections during learning (assuming they are aware of what their colleagues are doing) but the design of suites of within-subject standards fails to send a message that rich connections might be sufficiently important to assess.

³³ In theory of course there should be no “easy credits” at NCEA Level 3 because all of the standards should be set at NZC Level 8. In practice, for many reasons, there will always be perceptions that some standards are easier to achieve than others,

By contrast with traditional discipline-based subject thinking, the coherence within the science issues course rests on quite different curriculum assumptions, and its development of competencies for future citizenship is explicit. Over a series of carefully chosen and sequenced contexts, the threads of the developing science competencies unfold and grow stronger. Students return recursively to the same set of competencies, each time adding to their repertoires of expertise and gaining a richer and deeper sense of how to deploy these competencies in real-life decision making. This type of coherence is demonstrably better aligned with 21st century curriculum thinking, as outlined in the first section of the report. But university entrance regulations act as a barrier to this type of course design, particularly at Year 13, but with “pathways” implication for the design of Year 12 options.³⁴ The perverse incentive is to keep course structures as they have always been, rather than to embrace the innovation demanded by 21st century curriculum thinking.

The other technical design challenge discussed in this section concerns the need to balance internally assessed standards with at least one standard that is externally assessed, thereby further constraining design choices already impacted by university entrance regulations. Again, the thinking behind the regulation is understandable and its intent defensible. Externally assessed standards provide an important means of checking students' abilities against a wider peer group. In this way they serve as a complement to other moderation processes. However, rightly or wrongly, there is a perception that externally assessed standards are harder to achieve and therefore of relatively more value than internally assessed work.³⁵ In the sciences, and no doubt in other subjects that have traditionally been content dominated, these externally assessed standards still tend to focus on traditional examination style content-based questions. Together with the perception that these are the more rigorous standards, the structure of these external assessments arguably helps perpetuate the belief that the learning that really matters is the demonstration of content acquisition and understanding.

The outcomes planned for the issues course described in this case study require the demonstration of aspects of *competency*. Opportunities to show what you can do in turn require engagement with meaningful tasks and contexts. As some other learning areas—notably the arts—have shown, it is possible to develop processes for externally assessing types of *performance*. Portfolio assessments, for example, could work very well for an issues course such as the one discussed in this section. Broadening the scope of external assessment processes in the sciences (and other content-dominated subjects) could be a fruitful focus for the next round of NCEA design work, assuming there will be one. In the meantime, there is little incentive for the majority of science teachers to design innovative courses that really do reflect 21st century outcomes signalled as important by NZC.

³⁴ Ironically, coherence of pathways is also specified in the NZC principle of *coherence*.

³⁵ This finding is discussed in the third of the Learning Curves reports, for example (Hipkins et al., 2005).

5. Working for system-wide curriculum change

The central issue explored in this report is how to continue developing robust and appropriate relationships between NCEA and NZC. These relationships need to support schools' and teachers' curriculum thinking along lines that enable the 21st century intent of NZC to be appropriately realised in classroom teaching and learning.

The first section of the paper introduced six 21st century principles for learning and used these as a critical frame with which to examine existing research on NCEA, with a specific focus on what might be inferred about challenges for teachers' curriculum thinking. In this way, four broad sets of challenges were identified:

- The focus of NCEA assessments needs to reflect the signals given by NZC about important *purposes* for learning a subject. The challenge here is to shift thinking and practice away from what was essentially a *sorting* purpose, where ranking students on examination results was the outcome that really counted, notwithstanding the knowledge/skills outcomes actually achieved and assessed. NZC's "21st century learning" signals, combined with the succinct framing of purposes provided by the *Essence Statements* for each learning area, challenge schools and teachers to design courses and assessments that focus on what students can *do with their learning*, and the sorts of people their learning might support them to *be and become*. Purposes here relate to a more authentic use of knowledge and skills, and also direct attention to building dispositions to keep on learning.
- The manner in which suites of achievement standards are developed and the qualification is regulated should allow for *course structures* to flexibly meet the purposes for learning that teachers do envisage. One considerable challenge here is that courses developed to address authentic and active use of knowledge are likely to cross traditional course boundaries, calling for more flexibility in course design and, potentially, school timetabling practices. Learning is also likely to stray beyond the boundaries of the school (in terms of both time and place) so greater interactions with the local community are implicated.

- Students are likely to be more *motivated* and *engaged* their learning if this is seen to matter for more than the mere gaining of credits. The challenge here is related partly to thinking about purposes and course design, as already outlined, but it also has important *pedagogical* dimensions. Enabling students to experience active and more personalised learning challenges teachers to take a somewhat different classroom role, to design quite different sorts of learning and assessment tasks and to “change the script” of their motivational conversations about why learning matters.
- NZC conveys a clear *expectation* that every student will experience challenging and worthwhile learning that extends and strengthens their current capabilities. As already noted, the courses, learning and assessment tasks designed should reflect this aspiration to personalise learning in nontrivial ways. A related challenge is that doing so requires teachers to know their students well, and to have deep and flexible curriculum knowledge that they can adapt in response to students’ needs as these arise.

Every one of these four complex sets of challenges implicates professional learning (or un-learning) challenges. There is a great deal here for schools and teachers to think about as they continue to respond to the challenge of meeting their students’ learning needs by creating innovative practice at the NZC–NCEA intersection. This final section brings the four challenges together and highlights the interrelationships between them through the lens of the learning experiences offered to students in the case study schools.

Purposes for learning and course structures

It was evident that all the teachers with whom we worked had a strong vision concerning the relevance and importance of the learning experiences they designed. In different ways, all of them had moved beyond traditional backpacked course delivery.

For the teachers at Hagley Community College, this vision related to *re-engaging* students and getting them back on *any* successful learning track. NCEA’s flexibility of timing (in relation to internal assessment in particular) was employed to great effect here.

The Newlands College HOF who designed the science issues course expressed a strong commitment to education that prepared students for *responsible citizenship*. Many science teachers would doubtless express similar sentiments, but perhaps just hope for such outcomes while they pursue “business as usual”. In this course, competencies for science-informed citizenship were quite explicitly the focus and the point of the learning. NCEA’s flexibility did accommodate the design of this course but associated regulations, and specifically those related to university entrance, potentially place impediments in the way of offering such courses at NCEA Level 3. Given the clear message about the importance of citizenship outcomes in the NZC *Essence Statement* for the science learning area, arguably it should not have been so hard to find a full suite of standards that could appropriately assess a course that reflected this purpose. More standards that reflected this purpose should have been available within each of the science discipline areas.

The university entrance regulations also have implications for courses that explore complex issues that cross discipline boundaries. Section 1 noted that NZC promotes this type of coherence but as we have seen NCEA does not do so yet. This is an area where further thinking and development could be productive.

Expansive conversations about the relationship of historical events to students' own lives were valued by the history teaching team at WEGC. The difference between this course and the science issues course was that the new suite of NCEA history achievement standards supported the approach the WEGC team took, while the science teacher had to think very creatively to transcend the limitations of the more traditional suite of standards in her learning area. Given the emphasis NZC gives to science learning as a preparation for future citizenship, there are implications here for the future evolution of the science standards.

High expectations that engage and motivate students

The ways in which the teachers in this study sought to motivate students were nuanced and strategic. A simple differentiation between extrinsic and intrinsic motivation is not particularly helpful here. All the teachers saw early success as important: they worked hard to help their students gain credits from internally assessed standards early in each course. However, their reasons for doing so related more to changing learners' expectations of themselves than to simply gaining credits as *the* reward for learning effort. Students come to their NCEA years with "learning careers" and "assessment careers" already well established.³⁶ For some students these cumulative "career" experiences point to confidence in their own ability and ongoing success, but others perceive disappointment, failure and low expectations in their personal track record over time. Early success—provided it is real success in the form of worthwhile learning seen to be of value to self and others—can be a circuit breaker here.³⁷

Similarly, the opportunity to gain merit or excellence in a specific aspect of learning is not simply about the motivation afforded by competition between students (as gaining higher examination scores might have been), or about the extra credits that do come with these passes (although these can be important for university-bound students). Rather, a large part of the attraction lies in the *qualitative* differentiation of the level of competency gained. Students in these courses were challenging themselves and their peers to step up because the

³⁶ For a discussion of the idea of personal learning and assessment experiences as building cumulatively to an experienced "career", see Ecclestone and Pryor (2003).

³⁷ Students in the Learning Curves project whose learning careers had been full of struggle and disappointment in their pre-NCEA years were not oblivious to the nature of the "success" they were now being offered. Like other students and teachers, they knew that credits from unit standards were perceived to be of lesser value. They certainly knew their place was at the bottom of the learning heap, regardless of the credits they were accumulating.

learning mattered for more than its own sake. In this way issues of motivation and the sense of important learning purposes were intertwined.

It was evident that all these teachers worked to build a strong sense of *community* in their classrooms. In the case of the at-risk students in the short-term catch-up classes, there was an urgency about the learning that was somewhat akin to responses invoked by communities under duress. The students were aware of the need to support each other and to keep focused in order to stay on top of the rapid-fire pace of the learning. Rather than discouraging them, it is food for thought that this urgency served to meld the group and keep them on track in a way that many had not been in the previous months or years. NCEA's flexibility of timing is a positive enabler here.

In all three schools the teachers worked hard to make space for students to learn about themselves and their own potential—to bring something of who they were and what they were interested in to their learning, and to build from this positive, more personalised foundation. Diversity was seen as an asset rather than a liability in these open, flexible learning environments. There was a strong sense of purpose, and this was accompanied by motivating pedagogical strategies. Students in all three cases could and did achieve NCEA success, sometimes much to their initial surprise. This is an especially important observation in the light of the current expectation that 85 percent of students gain a NCEA Level 2 qualification. Even stronger alignment between NCEA and NZC would be one helpful way for the whole education system to respond to this challenge.

Teachers as ongoing learners

The complex challenges of moving a well-established school system into the 21st century provide the framing for these three case studies. There is a great deal here for schools and teachers to think about, including surfacing tacit beliefs that underpin traditional teaching and assessment practices and ways of organising learning in the school. One of the six principles for 21st century learning, briefly outlined in the first section of the report, concerns the ongoing professional learning demands for all teachers—both *during* their day-to-day work and as they think and plan for future initiatives and challenges.

When teachers do successfully innovate their courses, a sense of highly engaged ongoing professional learning seems to be a key part of the experience. The teachers at Hagley worked very hard to learn as much about their students as possible in a contracted space of time. The students gained a clear sense that they were all in this venture together and the teachers' active engagement with their needs was one of the keys to their success. In the history and science courses the students' sense of learning together was fostered by the teachers' open approach to curriculum innovation and change. This positioned the teachers as actively learning alongside the students as they explored the potential of new NCEA standards (in history) or new course combinations that exploited NCEA's flexibility for

combining achievement standards (in biology). These teachers and students were living the NZC principle of active and ongoing (lifelong) learning.

This report has suggested that additional alignment work is needed in science. This could also be true of other learning areas that were beyond the scope of the three case studies. Even in subjects such as history, where the NCEA achievement standards do seem to better reflect the intent of NZC, there is doubtless more for teachers to learn. In many cases the WEGC teachers were concerned that some of their peers may not yet fully understand the intent of these new standards. These observations point to the importance of ongoing opportunities for all teachers to reflect on the purpose and implications of the NCEA alignment changes.

One noteworthy characteristic of the case studies is that these leading teachers were also actively engaged in professional learning, and this was supported and encouraged by their schools. The HOF at Newlands was engaged in doctoral-level studies, as were one deputy principal at Hagley and the HOF who began the social science changes at WEGC. The next HOF at WEGC was part of a Teaching and Learning Research Initiative (TLRI) project team that partnered a number of leading history teachers with history education academics. Researchers of sustainable school change have noted the important role played by critical “outsiders” who hold up a mirror to practice (Heckman & Montera, 2009). But of course teachers and school leaders must be willing to look equally critically at what is reflected back to them, and have the knowledge, skills and means to act on what they see.

Next steps?

Each of these case studies illuminates a different way in which the flexibility of NCEA can potentially be constructively exploited to create innovative practices that address different student learning needs and challenges. NZC, as a framework curriculum, is similarly and deliberately flexible and open to innovation. The intention of both NCEA and NZC is that students, with their specific learning needs, are located at the heart of planning and action. With some caveats (e.g., university entrance regulations, individual standards that require further work) curriculum creation at the NZC–NCEA intersection is already able to provide the structural framework within which “21st century” changes are made possible.

However, these types of change create challenges for traditional subject-centred thinking and action, not least of them learning new ways to deploy deep subject expertise to build dynamic learning partnerships between teachers and students. Change is occurring, as we have documented. But it is effortful and complex, and requires leadership support for the innovators who are showing the way. At the very least, a helpful next step could be creating a wider conversation where these successes, challenges and new professional learning can be shared and more widely debated. It will also be important to keep working on the dynamic relationship between NCEA and NZC as their associated structures and practices continue to evolve. Perverse incentives that work against change need to be guarded against and

positive incentives leveraged wherever they have been found or can be created. Transforming the senior secondary school experience is a challenge for the whole system.

Afterword

Very soon after this report was completed, NZQA quietly released a circular that announced changes to the list of Approved Subjects for University Entrance.

The teacher in the third case study stumbled upon this by chance and immediately recognised its significance for her course planning. Acknowledging that nonspecialist science courses might legitimately draw from a mix of the other senior science subjects will allow her to go ahead and design a Level 3 science issues course that creates an ongoing pathway for students who want to stay in science, but not specialise.

This will be a very welcome change. However, because there was no associated publicity, it seems likely that at the time of writing this afterword (late August 2012) other teachers who need to know may not yet be aware of the shift in policy thinking. The circular can be accessed from <http://www.nzqa.govt.nz/about-us/publications/newsletters-and-circulars/secqual/changes-to-the-list-of-approved-subjects-for-university-entrance/>

References

- Bell, B., & Baker, R. (Eds.). (1997). *Developing the science curriculum in Aotearoa New Zealand*. Auckland: Longman.
- Bolstad, R., Gilbert, J., McDowall, S., Bull, A., Boyd, S., & Hipkins, R. (2012). *Supporting future-oriented learning and teaching: A New Zealand perspective*. Retrieved from <http://www.educationcounts.govt.nz/publications/schooling/109306>
- Boyd, S., & Hipkins, R. (in press). Student inquiry and curriculum integration: Shared origins and points of difference. *set: Research Information for Teachers*.
- Boyd, S., with McDowall, S., & Ferral, H. (2006). *Innovative pathways from school: Taking the first step*. Wellington: New Zealand Council for Educational Research.
- Bull, A., Gilbert, J., Barwick, H., Hipkins, R., & Baker, R. (2010). *Inspired by science: A paper commissioned by the Royal Society and the Prime Minister's science advisor*. Wellington: New Zealand Council for Educational Research. Available at http://www.nzcer.org.nz/default.php?products_id=2647
- Cowie, B., Hipkins, R., Boyd, S., Bull, A., Keown, P., McGee, C. et al. (2009). *Curriculum Implementation Exploratory Studies: Final report*. Wellington: Ministry of Education.
- East, M., & Scott, A. (2011). Working for positive washback: The potential and challenge of the standards–curriculum alignment project for learning languages. *Assessment Matters*, 3, 93–115.
- Ecclestone, K., & Pryor, J. (2003). 'Learning careers' or 'assessment careers'? The impact of assessment systems on learning. *British Educational Research Journal*, 29(4), 471–488.
- Gilbert, J. (2005). *Catching the knowledge wave? The knowledge society and the future of education*. Wellington: NZCER Press.
- Heckman, P., & Montera, V. (2009). School reform: The flatworm in a flat world: From entropy to renewal through indigenous invention. *Teachers College Record*, 111(5), 1328–1351.
- Hipkins, R. (2007a). *Course innovation in the senior secondary curriculum: A snapshot taken in July 2007*. Wellington: New Zealand Council for Educational Research.
- Hipkins, R. (2007b). *Taking the pulse of NCEA*. Wellington: New Zealand Council for Educational Research.
- Hipkins, R. (2010). *The evolving NCEA*. Wellington: New Zealand Council for Educational Research.

- Hipkins, R. (2012a). Assessment of naturally occurring evidence of literacy. *Assessment Matters*, 4, 95–109.
- Hipkins, R. (2012b). The engaging nature of teaching for competency development. In S. Christenson, A. Reschly & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 441–456). New York: Springer.
- Hipkins, R. (2012c). *Building a science curriculum with an effective nature of science component*. Wellington: New Zealand Council for Educational Research.
- Hipkins, R., & Boyd, S. (2011). The recursive elaboration of key competencies as agents of curriculum change. *Curriculum Matters*, 7, 70–86.
- Hipkins, R., Conner, L., & Neill, A. (2006). *Shifting Balances 2: The impact of NCEA implementation on the teaching of geography and home economics*. Wellington: Ministry of Education.
- Hipkins, R., & Hodgen, E. (2012). *Curriculum support in science: Patterns in teachers' use of resources*. Wellington: New Zealand Council for Educational Research.
- Hipkins, R., & Neill, A. (2006). *Shifting Balances: The Impact of Level 1 NCEA on the Teaching of Mathematics and Science*. Wellington: Ministry of Education.
- Hipkins, R., & Vaughan, K. (2002). *From Cabbages to Kings: Interim research report - first year of Learning Curves: Meeting student learning needs in an evolving qualifications regime*. Wellington: New Zealand Council for Educational Research.
- Hipkins, R., Vaughan, K., Beals, F., & Ferral, H. (2004). *Shared pathways and multiple tracks. Interim research report—second year of Learning Curves, Meeting student learning needs in an evolving qualifications regime*. Wellington: New Zealand Council for Educational Research.
- Hipkins, R., & Vaughan, K., with Beals, F., Ferral, H., & Gardiner, B. (2005). *Shaping our futures: Meeting secondary students' learning needs in a time of evolving qualifications. Final report of the Learning Curves project*. Wellington: New Zealand Council for Educational Research.
- Hipkins, R., Wylie, C., & Hodgen, E. (2012). *Laying learning foundations to lift success at NCEA level 3*. Wellington: New Zealand Council for Educational Research.
- Madjar, I., & Mckinley, E. (2011). *Understanding NCEA: A relatively short and very useful guide for secondary school students and their parents*. Wellington: NZCER Press.
- Ministry of Education. (1999). *Health and physical education in the New Zealand curriculum*. Wellington: Learning Media.
- Ministry of Education. (2007). *The New Zealand curriculum*. Wellington: Learning Media.
- Ministry of Education. (2008). *Approaches to social inquiry*. Wellington: Learning Media.
- Wineberg, S. (2001). *Historical thinking and other unnatural acts: Charting the future of the past*. Philadelphia: Temple University Press.
- Wylie, C., Hipkins, R., & Hodgen, E. (2008). *On the edge of adulthood: Young people's school and out-of-school experiences at 16*. Wellington: Ministry of Education.
- Wylie, C., & Hodgen, E. (2011). *Forming adulthood: Past, present and future in the experiences and views of the competent learners @ 20*. Wellington: Ministry of Education.

Appendix A: NCEA-related research at NZCER

Learning Curves

The Learning Curves project tracked actual course development/changes and teachers' thinking about these during the first 3 years of NCEA implementation in six medium-sized secondary schools. On each visit the researchers: interviewed HODs of five learning areas to discuss the thinking and constraints behind their course design; surveyed students about their subject choices (in the final we instead held nine student focus groups in each school); collected all relevant school documentation; and interviewed the principal and where possible several deans. There are three research reports (Hipkins & Vaughan, 2002; Hipkins, Vaughan, Beals, & Ferral, 2004; Hipkins & Vaughan, with Beals, Ferral, & Gardiner, 2005). All are accessible on NZCER's website.

Course Innovation

This was a short online survey conducted in 2007. The survey format was informed by findings from Learning Curves and invited teachers to identify, and where relevant briefly describe, innovative courses in their schools. All secondary school principals were contacted by email and given password protected access to the survey, which was to be completed by a staff member with a good overview on the school's curriculum. During the 10 days the survey remained live 141 schools visited the site and 124 schools completed and submitted their survey. These schools were a good representation of the full diversity of settings in which secondary school students learn. There is one report (Hipkins, 2007a).

Shifting Balances

There were two Shifting Balances projects. Each round entailed interviews with 10 teachers in two subject areas (mathematics and science in the first project, geography and home economics in the second project). The teachers chosen were regarded as leaders of change in their respective subjects and the research investigated the nature and extent of NCEA-enabled pedagogical change in their senior classes. We found some shifts in all subjects but in many cases these were compensated by counter-shifts that effectively stalled more far-reaching change. The exception was home economics, which had become a very different subject compared to pre-NCEA courses. There are two reports, accessible on NZCER's website (Hipkins, Conner, & Neill, 2006; Hipkins & Neill, 2006).

National Survey of Secondary Schools

This survey is conducted every 3 years and probes the views of principals, teachers, members of boards of trustees and some parents. NCEA questions relevant to each of these groups were included in the 2003, 2006, 2009 and now 2012 surveys. Two NCEA-specific reports discuss trends in NCEA views and show associations between these and other aspects of curriculum thinking and school organisation, particularly for the teachers and principals. Both reports can be accessed on NZCER's website (Hipkins, 2007b; Hipkins, 2010).

Competent Learners

This longitudinal study tracked one cohort of around 500 students from preschool right through to age 20. The research investigated the perspectives of teachers and parents and the students themselves. During secondary school, data were also gathered about their course choices and their experiences in different classes were documented. The main focus of the study was the development of students' cognitive and attitudinal competencies. Data gathered at age 16 (Wylie, Hipkins, & Hodgen, 2008), and again at age 20 (Wylie & Hodgen, 2011) provide useful insights into the impact of NCEA on learning. The most recent report shows the importance of gaining Level 2 NCEA to subsequent learning and employment pathways (Wylie & Hodgen, 2011). A paper developed from this report discusses one smaller group of students with lower competencies in their primary school years who nevertheless went on to successfully gain NCEA Level 3 (Hipkins, Wylie, & Hodgen, 2012). All these reports, and more, can be accessed from the project page on NZCER's website.