EDUCATION

# SAVE OUR SCHOOLS

## Solutions for New Zealand's Education Crisis

**Michael Johnston**

THE NEW ZEALAND INITIATIVE

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## Solutions for New Zealand's Education Crisis

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This manifesto draws on the body of research compiled at The New Zealand Initiative over the past decade to bring together a coherent plan to improve our education system, and to restore it to a place of international pre-eminence.

### About the New Zealand Initiative

The New Zealand Initiative is an independent public policy think tank supported by chief executives of New Zealand businesses. We believe in evidence-based policy and are committed to developing policies that work for all New Zealanders.

Our mission is to help build a better, stronger New Zealand. We are taking the initiative to promote a prosperous, free and fair society with a competitive, open and dynamic economy. We are developing and contributing bold ideas that will have a profound, positive and long-term impact.

## ABOUT THE AUTHOR

Dr Michael Johnston is a Senior Research Fellow at the New Zealand Initiative. He is a cognitive psychologist by training and completed his PhD at the University of Melbourne in 1997. He commenced his academic career as a lecturer in psychology and became interested in educational assessment and measurement during a six-year tenure as Senior Statistician at the New Zealand Qualifications Authority. In 2011 he took up an academic role in the Faculty of Education at Victoria University of Wellington, where, prior to his appointment at the New Zealand Initiative, he was Associate Dean (Academic).


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# Contents

# Foreword

*Save Our Schools: Solutions for New Zealand's Education Crisis* is a significant document. I predict it will play a key role in the rescue of a once first-class education system. Two decades of systemic decline have recently been accelerated with the 'Refreshed Curriculum' and associated changes to the qualification system. These make the rescue increasingly urgent. The emptying out of academic knowledge and its replacement with discredited student-centred, cultural identity, and competencies approaches are the drivers of the decline. It is my hope that this Manifesto will provide the spark that will see these constructivist-based approaches abandoned and the return to a system with an international reputation for quality schooling and quality graduates.

Since the 1877 Education Act, which established a national schooling system for 'The People of New Zealand', the purpose of education has been to build our nation upon the accumulated knowledge of humanity. The intended benefits of this universal education system are numerous. Six generations of New Zealanders are educated; a robust economy is developed; stable democracy is secured through secular institutions – all enabling the social cohesion of a multi-ethnic population with different backgrounds but united in its commitment to our nation.

Our international reputation is built on this generational access to disciplinary knowledge – the sciences, social sciences, humanities and arts – all disciplines that adhere to recognised scientific methods and procedures in the ongoing search for truthfulness. The task of schools is to ensure that this knowledge, altered by curriculum design experts as academic subjects suitable for teaching to children, is taught to all equally, and by teachers who know the knowledge well.

Whether it is not too late to restore the best from our impressive past depends upon us acting now. The Manifesto provides the means to do this with its comprehensive account of the main parts of education's complex system: curriculum selection and design; assessments; qualifications; teaching and learning; teacher education, remuneration and career structures; evaluation and research; and importantly for parents – reporting on their children's progress. Each of these areas is subjected to a forensic treatment – from analysing the problems, to identifying the causes, to specific recommendations for redress.

The Manifesto's analysis is strengthened by Michael Johnston's comprehensive knowledge of scientific educational theories. Drawing on the latest scholarship from curriculum studies and evolutionary learning psychology, along with advice from internationally recognised educational experts, the Manifesto explains what is causing the relentless dismantling of a formerly first-class education system. It then draws on those knowledge and learning theories to provide theoretical justification for an impressive suite of recommendations.

The major accomplishment of the Manifesto is these recommendations. Each requires careful study, discussion, and debate. To my mind the most important concerns the curriculum. However any account of what should be taught at school also requires an account of teachers' subject knowledge and teaching expertise; that, in turn, leads to the myriad areas which make up the education system. Each needs attention. The recognition of systemic interdependence is shown

in the way the recommendations are linked. For example, what is suggested for teacher training is connected to proposals for curriculum selection and design. The recommendations for initial teacher education are tied to proposals for teachers' career structures, the curriculum recommendations to those concerning assessment, and so on.

With these recommendations the Manifesto restores teachers to their rightful place at the centre of education. Establish a fair and robust system for the training, certification, and remuneration of teachers and the quality of instruction will improve. It is that teacher quality which determines the quality of student achievement.

The author describes how current policies and practices promoted by the Ministry of Education and the New Zealand Council for Educational Research are based on the discredited educational approach known as 'constructivism', an approach floundering in the illiberal mire of postmodern relativism and marxist critical theory. These ideologies are used to justify what the Ministry calls a 'localised curriculum'. The reality is a curriculum where the content is selected in random ways that differ from school to school with each school reinventing the curriculum wheel. The resulting curriculum content may be nothing more than unjustified beliefs rather than subjects with an academic integrity grounded in disciplinary knowledge.

The New Zealand History curriculum shows what happens when academic integrity is abandoned. A community's collective memory, rather than independently verifiable historical material, is now the new History curriculum. (Indeed the erroneous term 'Histories', like many words in the Ministry of Education's Orwellian newspeak – others are 'learners' or 'akonga' and facilitator – is a strong signal of the ideology driving current policies.) The historical time perception that is a feature of evolutionary secondary thinking ability (i.e., intelligence) is replaced in the new curriculum by spontaneous time perception – a primary thinking ability. The result is serious. Students will be unable to think chronologically. They will not acquire the modern way of understanding time but will instead turn to pre-modern mythological explanations for causation and change.

The profound shift to how children think is not confined to the History curriculum. Science, too, is undergoing a similar change with the recent inclusion of mātauranga Māori throughout the curriculum. Academic subjects, the very material required for rational thinking, are replaced by the socio-cultural knowledge of the everyday world and its primary thinking abilities. This should be of huge concern to the nation. What students are taught creates how they think – it is how intelligence is formed. Students' ability to grasp difficult abstract ideas is seriously compromised by the curriculum shift to socio-cultural knowledge.

If constructivist education is not replaced by an academic curriculum with quality teachers, generations of New Zealand children will be excluded from a prosperous future. It was this vision of a better future for individuals and for society as a whole which motivated those who instigated the education system in 1877. It remains the motivation for subsequent immigrants right up to the present day. New Zealanders want a robust knowledge rich curriculum for their children. What they are currently receiving in many schools is not that.

Novelist Sebastian Faulks in *A Week in December* provides a prescient view of what awaits us. The main character, Gabriel explains how he was 'lucky enough to be educated at a time when teachers still thought children could handle knowledge … Then the teachers withheld knowledge. I suppose the next lot of teachers didn't have the knowledge to withhold. Now knowledge has been abandoned as a goal'.

His final phrase is damning on us all – 'We chose to know less'. This stark vision of a future characterised by increasing widespread ignorance and the accompanying decline in the population's intelligence must surely be a clarion call to action.

It is not only the curriculum that is in a weakened state. The Ministry's failed constructivism approaches extend to teaching and learning practices. Here the teacher is a facilitator, one who learns alongside the child. The student is a 'learner', someone who no longer studies knowledge, but learns – what? – from whom? In the jargon of constructivism – children are now in charge of their own learning. It is important to note that not all schools have abandoned knowledge. There are still many schools, indeed parents flock to these, that retain academic subjects and recruit the best teachers. However, this is a difficult task in the face of a Ministry determined to inculcate constructivism and cultural relativism throughout the entire system.

The Manifesto provides the alternative. It makes the case for school subjects that are derived from and accountable for their integrity to foundational disciplines. It rejects claims that the authority for school knowledge is from the local community and that the purpose in transmitting school knowledge to each generation is to socialise the child into his or her cultural identity. The development of cultural identity is a matter for the home and for the various social, cultural, and religious communities to which parents belong. Communities are for the transmission of cultural beliefs and practices. In contrast, as the Manifesto makes clear, schools are for the transmission of academic knowledge and for the socialisation of children into the democratic nation.

The Manifesto does not shy away from confronting the Ministry's inability to distinguish between the academic knowledge that belongs at school and community socio-cultural knowledge. Recommendation Four addresses the conflation of two different types of knowledge. It recommends that, 'in a new curriculum to be available in English and the Māori language, both bodies of knowledge are accessible to all young New Zealanders.' However I would suggest further clarification. Any inclusion of mātauranga Māori, and for that matter other socio-cultural beliefs, for example, those concerning creationism and sex and gender identity, should recognise that school instruction is *about* those matters. School instruction is not inculcation *into* beliefs systems.

The distinction between *instruction about* and *instruction into* is crucial to ensuring that our school system is secular. Collapsing the distinction is undermining the secularism established in the 1877 Education Act as the means to ensure tolerance between groups with disparate backgrounds. Secularism is as important today as it was in the 19th century – indeed with our increasingly diverse population the role of secularism in creating the tolerant public space is arguably more important now than ever. Schools are often the first public space encountered by children. It is where they leave the home and community with its shared beliefs and practices to take their first steps into a society that is different from the home, where different people have different beliefs and practices, where they become a nascent citizen. School is the first stage of the difficult but invigorating path into society – into the public sphere of a liberal democratic society.

The Manifesto's Recommendations concerning academic subjects point to the need to design the curriculum in a coherent and cumulative way, to recognise that school knowledge is very different from the socio-cultural knowledge of the home. Other recommendations for organisational and administrative improvements all deserve serious attention. Education is a complex system but if founded on the commitment to academic knowledge for all young people, can be coherent and effective.

Our 19th century ancestors, both Māori and settler (including several ethnicities), established a national schooling system at a time when the nation's infrastructure was undeveloped, when the population was small, and when social cohesion was in its infancy. This was a mighty achievement and should be recognised for its ambitious vision. This Manifesto continues that vision. It will be, I hope, the turning point in New Zealand education that is so desperately needed. To rephrase Sebastian Faulks' words: 'We can choose to know more.' *Sapere aude!*

**Elizabeth Rata**
18th March 2023

# Executive Summary

New Zealand's once world-leading school education system is in a state of deep malaise. Objective international measures show an ongoing decline in key achievement areas, including literacy, numeracy and science. Too many students are leaving school ill-prepared for tertiary study, work and life.

This manifesto lays out the many problems besetting the system – from the *Education and Training Act* to curriculum and qualifications to teacher training and remuneration to educational monitoring, evaluation and research. Policy solutions for each of these problems are also presented.

## The Education and Training Act

The *Education and Training Act 2020* stipulates four objectives for school boards. One is to "enable students to attain their highest possible standard in educational achievement." The other three are not true objectives; rather, they are strategies to achieve the first. The three extraneous objectives risk distracting Boards from focusing on this, central, goal.

### Proposal

The *Education and Training Act 2020* should be amended to enshrine a focus on educational achievement as the paramount objective of school boards. The other objectives stipulated in the Act should monitored by the Education Review Office (ERO) in its school reviews.

## Curriculum

The current New Zealand Curriculum (NZC) was implemented in 2007. Since then, educational achievement has declined precipitously. The curriculum has played a role in this decline. It is knowledge poor and does not provide teachers with sufficient guidance. Instead, teachers are charged with developing local curricula around the very loose framework provided by the NZC, a task that most teachers are not trained to carry out.

The curriculum foregrounds 'key competencies', most of which represent knowledge that human beings acquire naturally. It deemphasises subjects based on academic disciplines, which need to be explicitly taught by experts. Thus, the curriculum is exactly backwards in approach: It emphasises knowledge that does not need to be directly taught, and places insufficient emphasis on knowledge that does.

In a recent 'refresh' of the curriculum, the Ministry of Education has signalled an intention to weave Mātauranga Māori into every learning area. Doing this with academic disciplinary subjects will create confusion, of both those subjects and Mātauranga Māori. That is because the knowledge bases of most disciplinary subjects have ontological and epistemological characteristics that are incompatible with the knowledge base of Mātauranga Māori.

## Proposals

1. A new curriculum is needed. It should emphasise disciplinary *subjects* – a more specific and epistemically meaningful term than *learning areas* – much more than the 2007 curriculum does. What is to be taught at each curriculum level should be better specified, with guidance for teachers on the sequencing of learning should be provided. All New Zealand students would learn this specified knowledge. It would form a 'common core', irrespective of any local variation.

2. Key competencies should be de-emphasised in the new curriculum. This is not because they are unimportant, but because, with the exception of *symbols and texts*, they do not need to be directly or explicitly taught. Instead, schools should be advised on creating environments that foster the acquisition of adaptive biologically primary knowledge. During their training, teachers should also learn about the acquisition of primary knowledge and establishing learning environments conducive to acquiring it in educationally and socially adaptive ways.

3. Literacy and numeracy are foundational skills that enable access to the wider curriculum. Any new curriculum should specify detailed progressions based on structured literacy and numeracy pedagogy. These progressions should extend throughout the school curriculum, although they may be at least partly subsumed by literate and numerate disciplinary subjects at secondary curriculum levels. The progressions should include a focus on handwriting.

4. A new curriculum should represent Mātauranga Māori and universal disciplines separately rather than trying to integrate them in the same subjects. Both should be available in English and Te Reo Māori so both bodies of knowledge are accessible to all young New Zealanders.

## Assessment for Qualifications

The National Certificate of Educational Achievement (NCEA) qualifications system has been fully in place for nearly two decades. During that time, it has undergone numerous changes to address the technical problems that nearly caused its early demise. While those technical problems have now largely been resolved, the design of NCEA remains fundamentally flawed.

The highly disaggregated approach to assessment under NCEA detracts from curriculum coherence. Superficial learning is often encouraged by lax internal assessment practice. Standards in each subject are used selectively, with decisions often driven by which standards are perceived to be the most straightforward to attain. External assessment is increasingly avoided. These factors risk leaving critical gaps in students' knowledge.

The continual barrage of internal assessment and reporting of associated grades throughout the school year keeps students and teachers focused on accumulating credits, to the frequent detriment of deep teaching and learning. Marking of internal assessment shows poor national consistency, with grade inflation reflected in rising *Excellence* grades over the years. This trend is too great to be credibly linked to improvements in learning. The *post-hoc* moderation system is expensive to run and does not have sufficient influence to bring acceptable reliability to internal assessment.

### Proposals

1. In each subject, curriculum content should be divided into that which is best assessed (1) in a time-limited examination, and (2) using another assessment mode. The former should then be assessed in a single examination for each subject at the end of the school year. The latter should be assessed in whatever way best suits the knowledge in question – examples include essays, laboratory reports and research projects.

   Internal assessment should be as integrative as possible, meaning that it should be used to bring together the year's subject content. Work might be carried out over a long period and submitted at the end of the school year. Teachers should provide feedback supporting learning, following guidelines ensuring that submitted assessments are authentically a student's own work.

2. All assessment, internal and external, should be marked and graded at the end of the school year by marking panels convened by NZQA. Both should use profiles of expected performance and grade score marking to control variability. No grades should be reported during the school year.

## Initial Teacher Education

During the first decade of the 21st century, teacher education was largely brought under the auspices of academia, when teachers' colleges were merged into universities. Seasoned teacher educators were required either to complete PhDs and become active researchers or leave the profession. Much expertise was lost and the time of those remaining became divided between teacher education and new research expectations.

Initial Teacher Education (ITE) is dominated by sociological perspectives, with very little focus on insights for teaching and learning from scientific research in cognitive psychology. Misguided and ineffective methods of literacy and numeracy pedagogy are promulgated in many teacher-education programmes. Primary teachers are expected to become expert in the entire curriculum; specialist teachers are uncommon in the primary school sector.

The programmes themselves tend to be delivered using a rigid model, with coursework interspersed with professional placements. But neither the faculties of education nor the schools in which beginning teachers complete their qualifications tend to inculcate pedagogical knowledge and skills based on scientific research. Nor do they teach sufficient assessment literacy to enable teachers to provide the most effective feedback to students.

### Proposals

1. ITE should be reformed, with a much greater focus on knowledge of human cognitive processes and the implications of this body of knowledge for teaching and learning. Additional focus on the use of assessment to improve teaching and learning would also be highly beneficial. To drive these changes, teacher registration criteria and the Standards for the Teaching Profession will need to be amended to reflect this requirement. Most providers will need support to acquire expertise in this area.

2. The current malaise is partly attributable to a near monopoly in teacher training enjoyed by universities. Teacher educators should be released from academic publishing imperatives and focus more tightly on their core role. Barriers to competition in teacher education should be removed. New funding models should be adopted to make establishing specialist teacher education organisations much more straightforward.

3. ITE for primary school should include specialisation to improve the quality of teaching in each curriculum area and promote more comprehensive curriculum coverage.

4. Far too many teachers in our schools have been trained to use ineffective pedagogy. Training new teachers in effective approaches is essential, but deficits in the professional knowledge of already-practising teachers must also be addressed. This will take a major professional development initiative. Structured professional learning for practising teachers, based on sound scientific research, should be funded by the Ministry. While schools are free to purchase professional development of their choosing, the Ministry should only fund programmes based on generalisable, scientific research evidence.

## Teachers' career structure

Teaching is a highly unionised profession. For many years, both the Post Primary Teachers Association (PPTA; the secondary teachers union) and the New Zealand Educational Institute (the primary teachers union) have fiercely opposed any changes to the 'time served' model of teacher remuneration. Under this model, teachers' pay increments are based solely on the duration of their service as teachers, disregarding variation in merit or competence. Neither is there any flexibility to pay a premium to attract a teacher capable of teaching subjects for which it is difficult to recruit, such as mathematics and science. The extant model provides no incentive for highly competent teachers to remain in the profession, nor any impetus for incompetent ones to leave.

### Proposals

1. Effective teachers should be recognised through higher remuneration and status, using an approach similar to the four-tier structure in Australia. Like that model, promotions should be made on the basis of evidence against professional standards. Criteria should include:

    a. curriculum knowledge;
    b. knowledge of learning processes;
    c. ability to design and administer courses of study;
    d. engagement with colleagues and school communities; and
    e. evidence that students are making appropriate progress.

2. Promotions could be determined by committees comprising principals and senior teachers. A promotion committee could be established for each kāhui ako (community of learning), with its members drawn from that community. All members of committees should be trained in performance evaluation, with principals getting more in-depth training as part of their professional development.

3. As well as receiving greater remuneration, teachers at higher levels of the career structure should have greater responsibility. These responsibilities might include mentoring young teachers and student teachers. Even so, care must be taken not to overload them with duties that interfere with their core job of classroom teaching.

## Teacher supply

Teacher recruitment is constrained by both onerous bureaucratic processes for immigrant teachers and rigid qualifications requirements for prospective local ones. Male teachers comprise just 15% of the primary teacher workforce and 36% of the secondary teacher workforce. It is likely that the dearth of male teachers is, in part, why boys continue to fall behind girls in educational achievement. There is no mechanism for skilled professions in other areas to become teachers without expensive and time-consuming study. Schools have very limited budgetary flexibility to hire the teachers they need, beyond Ministry of Education student-teacher ratio funding formulae.

### Proposals

1. Schools should be able to hire professionals with knowledge in critical areas without a teaching qualification. Where schools are fully accountable to their parents and communities, teacher performance, rather than their qualifications, should be the decisive factor. Even so, schools may wish to support teachers recruited in this manner to work towards an accredited qualification. If more convenient for teachers-in-training, study could be completed online in partnership with an accredited provider. Alternatively, a new provider could be established to provide online support for this mode of teacher recruitment.

2. There should be a concerted focus on encouraging more men to take up teaching.

3. Schools should be able to hire international teachers with key expertise without bureaucratic oversight. Immigration processes for these teachers should be expedited and rely only on good character checks. In the case of teachers from non-English speaking countries, certification evincing sufficient proficiency in English to teach in New Zealand should also be required. Again, schools would be responsible for ensuring that these teachers meet the requirements for registration in New Zealand within a reasonable timeframe.

4. Schools should receive a one-line budget, enabling them to pay a premium to staff in curriculum areas that are difficult to recruit in, or who are otherwise particularly valued. Per student funding should include both the operational and capital components of Vote Education and follow students who change schools.

5. New principals should receive mandatory, publicly funded courses focusing on management and financial competence.

## Systems Monitoring and provision of information to parents

New Zealand currently has no nationally consistent assessment process at any stage of schooling. No data on student achievement are published at the school level by the Ministry of Education, limiting the extent to which schools can be held accountable for the progress and achievement of students. Neither do parents have reliable sources of achievement or progress information to guide them in choosing schools for their children.

### Proposals

1. The National Monitoring Study of Student Achievement (NMSSA) should be resourced to undertake a reliable sample study of achievement in reading, writing and mathematics every year, at every year level from Year 1 to Year 10. From Year 4 on, a sample should be selected for science as well. Other curriculum areas could continue to be monitored on a rolling basis at Years 4 and 8.

2. New assessment tools should be produced for reading, writing, mathematics and science, suitable for teachers to use to assess their students without the training required to undertake NMSSA assessments. Alternatively, existing tools could be used if they show sufficient alignment with NMSSA. The measurement scales for these assessments must be well correlated and aligned with the NMSAA scales. Standard setting should be undertaken to calibrate the scale for each assessment with its NMSSA counterpart.

   The Ministry should support schools with statistical analysis, comparing progress made annually in each curriculum area by each year level with estimated NMSSA norms.

3. A statistical model should be developed to estimate the average progress expected in a year in each of the NMSSA curriculum areas, with adjustments to the estimates based on all of the socio-economic variables used to calculate equity index funding. The model would estimate progress norms and curriculum achievement expectations for individual schools.

4. A parent portal should be made available on the Ministry website. Schools could use the portal to inform parents, displaying comparisons of attainment and progress of students at each school with the socio-economically adjusted normative and curriculum progress expectations estimated by the model described in (3) above. These portals could also be used to publish other information for parents considered relevant by each school. This would provide parents with high-quality information to guide them in choosing schools for their children.

## The New Zealand Council for Education Research

The New Zealand Council for Education Research (NZCER) is mandated and partially funded by the Ministry of Education to study New Zealand's education system. The organisation produces high-quality assessment tools, including the Progressive Achievement Tests, which are widely used in schools. They also have a successful publishing wing. The research they conduct, however, is usually either qualitative, and therefore not generalisable, or survey based. While surveys produce useful information, research on, and evaluation of, Ministry initiatives such as Modern Learning Environments and child-led learning is urgently needed.

### Proposal

NZCER should be reviewed and partially repurposed. Its publication function should continue as is. Its psychometric and assessment work should be expanded and resourced to carry out an augmented NMSSA. The core research function of NZCER should be refocused on large-scale quantitative, generalisable research on teaching and learning. It would employ intervention studies and other methods to elucidate the most effective methods of teaching. This would include piloting all Ministry teaching and learning initiatives and evaluating them post-implementation. Some qualitative research should still have a place, especially in conjunction with larger-scale quantitative studies. The research should be published in reports, give best-practice advice based on that research, and be made available to all teachers.

# Introduction

There are many reasons to educate young people. Education grounds young people in culture – in knowledge and modes of self-expression that lead to a sense of belonging and identity. Young people also need to learn knowledge and skills that will enable them to earn a living. Education can break intergenerational cycles of poverty and disadvantage. A sound education is an equalising force, albeit an imperfect one.

In a democratic society, education also has a role in preparing young people for political participation. That means more than learning about political institutions. More fundamentally, democracy necessitates a contest of ideas. Education should prepare young people to participate in that contest respectfully, with sound thinking based on established knowledge.

These purposes may be summarised by saying that the purpose of education is to steep young people in the accumulated knowledge of the past, as a springboard to propel them into the future. Education should enable individuals to develop personally and to contribute socially and economically.

There are four main phases of formal education in New Zealand: early childhood, primary, secondary and tertiary. Both early childhood and tertiary education have expanded greatly in the past few decades. Early childhood education is increasingly understood as essential preparation for primary education, rather than merely as 'day care' for working parents. Tertiary education is now essential to accessing almost every field of employment. While acknowledging the importance of early childhood and tertiary education, this manifesto focuses on the compulsory primary and secondary sectors.

In the mid-20th century, New Zealand's compulsory education system was the envy of the world. Its overall performance was outstanding, despite its socio-economic inequity and educational discrimination, discussed in more detail below. Our literacy and numeracy teaching was second to none. Primary school education prepared our young people well for success in secondary education and beyond. New Zealanders were educated in a knowledge-rich curriculum, focused on grounding them in the natural and social sciences, mathematics, literature, the arts and physical recreation. As recently as 2000, PISA assessments run by the OECD placed New Zealand third in the world, topped only by Singapore and Finland.

The present state of schooling in New Zealand is a far cry from its halcyon days. Achievement in literacy and numeracy is now mediocre by international standards; just about every time the results of an international test are published, they show a decline relative to our own past performance. Our curriculum is knowledge poor and the Ministry of Education promotes pedagogy that runs counter to scientific research evidence. Teachers are ill equipped by their training to cope, not only with the academic needs of young people but, increasingly, with their social and emotional needs as well. Teacher burnout is common. Educational inequality is rife, with Māori and Pasifika students continuing to do less well than students of other ethnicities, boys falling increasingly behind girls, and persisting socio-economic disparities.

So, what went wrong?

There are many reasons for the decline of New Zealand's state education sector. Research, including that of The New Zealand Initiative, shows that problems in curriculum, assessment, pedagogy, teacher remuneration, incentives and accountability have all contributed.

This manifesto presents some ideas for bailing out our educational ship before it sinks, taking our social cohesion and economic prosperity with it. First, some history.

## Historical background

The foundation of public education in New Zealand was laid with the passage of the *Education Act 1877*.[1] The Act made education compulsory up to age 13 for all non-Māori children and entitled all, including Māori, to a free education. In 1894, education up to age 13 was made compulsory for Māori as well. The 1877 Act also established regional, democratically elected education boards and school committees.

The egalitarian spirit of the 1877 Act was consolidated when, in 1940, the first Labour government appointed Clarence Beeby as Director of Education. Beeby has attained a semi-legendary status in New Zealand's educational circles. While some of his ideas may, with hindsight, be debateable, there is no doubt of the extent to which he instilled pride in our education system.

Like the drafters of the 1877 Act, Beeby had a vision of an education system that would provide opportunities for all. In 1992, Beeby's 90th year, he wrote the *Biography of an Idea*, in which he said: "all persons, whatever their ability, rich or poor, whether they live in town or country, have a right as citizens to a free education of the kind for which they are best fitted and to the fullest extent of their powers." His statement summarises the intent of this manifesto.

The education system established under Beeby's directorship was of very high quality but it was not perfect. Despite the egalitarian rhetoric of the 1877 Act and Beeby's sincere desire to the contrary, one serious flaw was demographic stratification. Throughout much of the 20th century, girls were often discouraged from studying the sciences or mathematics. Traditionally raised Māori children saw little of their own language or culture reflected in their schooling. Boys from working class backgrounds were often tracked into technical rather academic pathways, irrespective of their aptitudes or aspirations. All this reflected the social attitudes of the times.

Another flaw in 20th century New Zealand education was its qualifications system. In the fifth form (Year 11 now), students who were still at school – some having left on or shortly after their 15th birthdays – sat the School Certificate examinations. Under that system, about half the candidates in each subject were pre-destined to fail. (The precise proportions varied somewhat between subjects.) Until the 1990s, the raw marks for School Certificate examinations were adjusted by a process called *normative scaling*, ensuring that the predetermined proportion of candidates fell into each grade category. Those who passed at least three subjects, including English, could progress to the sixth form.

While some sorting measure was arguably justified, the stipulation that approximately half of all students would leave school with no more than a fifth-form education and no qualifications was arbitrary and unjust. In 2022, it would also be unsustainable; our economy has a shortage of skilled labour as it is. At that time, gaining an apprenticeship in a trade did not require any formal qualification. Now, NCEA Level 2 is the typical gateway into technical and trades training. Fifty years ago, plenty of low-skill employment was available, much of which could lead to prosperity. Now, the employment prospects for young people with no qualifications are poor.

## Where are we now?

**Curriculum and pedagogy:** The curriculum and pedagogy in New Zealand's schools is systemically flawed. The NZC is based on 'competencies' such as 'managing self' and 'participating and contributing', rather than centring knowledge disciplines. It promotes the 'child-centred' pedagogy, an approach that downplays the role and expertise of teachers, leaving pedagogy dangerously unstructured. This approach is not conducive to young people acquiring sophisticated disciplinary knowledge in subjects like science, mathematics and history. No cognisance is taken of the science of human learning and its powerful implications for pedagogy, either in advice provided by the Ministry, nor in the pre-service training of a large majority of teachers. In *New Zealand's Education Delusion*, Briar Lipson explored what has gone wrong in our curriculum and pedagogy, and how to begin to turn things around.[2]

**Literacy and numeracy:** The past 20 years have seen a decline in the performance of New Zealand's young people in international literacy and numeracy tests from its world-leading heights in the mid-to-late 20th century. New Zealand has fallen in international rankings; even worse, we have declined relative to our own past performance. The decline is largely attributable to ineffective teaching strategies despite the availability of sound research evincing more effective methods. Steen Videbeck's report, *Reading with the Light Switched On*, canvasses this research literature, with a particular focus on early literacy, and uses classroom vignettes to illustrate the current problems.[3]

**Demographics:** Educational inequality persists in New Zealand. Patterns of inequality have changed in some respects, although many of the old disparities remain.

Girls are now encouraged to study science and mathematics. Furthermore, they now outperform boys across nearly the whole education system. They gain all three levels of NCEA and University Entrance (UE) at higher rates than boys.[4] It is now boys who are disadvantaged. The reasons for this are not well researched. A lack of male teachers may be depriving many male students of same-sex role models and tilting school culture in a direction that disadvantages them. The systemic failure to develop the full potential of male students is incompatible with Beeby's egalitarian vision. Yet, the Ministry of Education has no plan to respond to the educational needs of boys, nor even to probe the reasons for the manifest sex differences in educational attainment.

Socio-economic differences in educational attainment remain entrenched. There is a gradient across socio-economic strata in the attainment of all three levels of NCEA and UE, with young people from wealthier communities attaining qualifications at higher rates than those from poorer communities. The gradient is particularly steep for UE, limiting the potential for degree-level study to overturn intergenerational cycles of poverty. Of course, degrees are not the only, or even, necessarily, the best, pathway out of poverty. However, all reliable pathways out of poverty are paved with educational success.

There are factors extrinsic to the school system that contribute to socio-economic gradients in educational achievement. Even so, it is incumbent on a publicly funded education system to afford children from less wealthy communities every opportunity to build successful lives. Currently fashionable methods of teaching promoted by the Ministry of Education are likely to steepen rather than flatten socio-economic gradients. This is because students from higher socio-economic strata are more likely than others to have parents with the educational and financial resources to compensate for the ineffective approaches typically used by schools.

Māori and Pasifika students continue to do less well than students of European or Asian descent. The Ministry claims that this is due to systemic racism in the education system.[5] That is a plausible, if unproven, hypothesis. Another potential explanation is that ethnic gaps are corollaries of socio-economic gaps; Māori and Pasifika students tend to come from less wealthy communities than students of other ethnicities.

Whatever the reasons for the socio-economic and ethnic gaps in educational attainment, they, like the gap in achievement between male and female students, give our young people uneven starts in life. A recent and particularly stark reminder of the failure of our education system to ensure that all children attain their full potential comes from a recent trial of new literacy and numeracy standards for NCEA.[6] Results for writing were particularly poor, with just 34% of students in the trial meeting the standard. Even more concerningly, just 2% of students in decile 1 schools passed the assessment, compared with 62% in decile 10 schools. There was also a substantial sex difference, with 42% of female students attaining the writing standard compared with 27% of male students.

To improve educational attainment for Māori students, Māori language and culture are now strongly represented in many schools. Mātauranga Māori (traditional Māori knowledge) is being embedded in nearly every curriculum area through a 'curriculum refresh' and new NCEA achievement standards.

Although it is long past due for Māori language and culture to be given greater prominence in New Zealand's education system, there is no generalisable evidence that this will, of itself, improve Māori achievement. Furthermore, the current approach is deeply flawed. When, for example, the Ministry claims that one of the 'big ideas' of statistics[7] is that "data … has whakapapa [lineage] and is a taonga [sacred treasure]"; observations "carry mauri" (life-force); and it risks both confusing an academic discipline and misrepresenting Māturanga Māori. Kaumatua Sir Mason Durie says:

> You can't understand science through the tools of Mātauranga Māori, and you can't understand Mātauranga Māori through the tools of science. They're different bodies of knowledge, and if you try to see one through the eyes of the other you mess up. They might be aiming at the same thing, but going there in different directions.[8]

**NCEA:** Between 2002 and 2004, NCEA was progressively introduced to serve the needs of a changing economy and society. It was a well-intentioned change. Under NCEA, students are credentialed according to their knowledge and abilities (criterion referencing) rather than being graded on their performance relative to others (norm referencing).

This move from norm-referencing to criterion referencing has a caveat: more students gaining qualifications does not of itself mean they are better educated. Even so, students who in the past would have failed School Certificate, but gain NCEA now, have at least learned something – and they should be credentialed for it. In taking this approach, though, we must not confuse higher levels of qualifications attainment with improved learning.

Notwithstanding the sound motivations for its inception, NCEA was, and remains, flawed in design. Its piecemeal approach to assessment has resulted in fragmented learning in many subjects. Its internal assessment system suffers from grade inflation. Students and teachers are obsessed with credit accumulation, harming the quality of learning and teaching.[9] All knowledge is credentialled as being of equal value, rendering many students' qualifications of dubious quality. Briar Lipson surveyed the many problems with NCEA in *Spoiled by Choice*.[10]

**Teacher training and career:** Our education system suffers from a lack of teacher supply. While this is, to some extent, a cyclical phenomenon, it is a long-standing problem in high-demand subjects like science and mathematics. Teaching quality in New Zealand's schools is patchy. Teachers' career structure provides little incentive for high-quality teachers to stay in the system. Furthermore, teaching is highly unionised and teachers' pay agreements do not allow salary differentials across teaching subjects to respond to supply and demand differences.

In *Teaching Stars*, John Morris and Rose Patterson advocated creating an aspirational career path for teachers, paying them on merit rather than time served in the profession, and opening new pathways into teaching.

**Systems monitoring:** New Zealand's education system has no current systems-level mechanism for monitoring its quality. There is no compulsory national assessment at any year level. While a large majority of students undertake NCEA in Years 11–13, its multiple approaches to assessment are incomparable. As of 2026, students will have to pass national literacy and numeracy assessments to acquire NCEA. That co-requisite will become the closest we have to compulsory national assessment.

The National Monitoring Study of Student Achievement (NMSSA) provides high-quality data for representative samples of students at Years 4 and 8. While NMSSA provides snapshots of systems level quality in these year levels, and some demographic disaggregation, it does not provide a basis for schools to monitor their performance, nor information for parents on the achievement of individual children. Furthermore, NMSSA data are not statistically adjusted to account for individual socio-economic variables. Joel Hernandez's *Tomorrow's Schools: Data and Evidence*, demonstrated a process by which educational data can be adjusted statistically, to control for socio-economic variables at the individual level.[11] Analysing NCEA results, Hernandez found that there is no systematic difference in rates of qualifications attainment across the decile range after accounting for socio-economic variance. A school's socio-economic location, then, is not a valid proxy for its quality.

## A manifesto for improvement

This manifesto draws on the body of research compiled at The New Zealand Initiative over the past decade to bring together a coherent plan to improve our education system, and to restore it to a place of international pre-eminence. The Initiative shares with Beeby a vision for an education system that enables every individual to reach his or her full potential psychologically, intellectually, aesthetically, socially and economically. Beeby probably would not have agreed with all, or even many, of our prescriptions. We agree with him, though, that bringing such a system about "will involve the reorientation of the education system."[12] This is a manifesto for such a reorientation.

Supplementing this report are accounts from schools that have adopted approaches to teaching and school organisation that accord with our recommendations. We visited three such schools.

**Manurewa Intermediate School** serves a community in South Auckland in which many families live in poverty. When current principal Iain Taylor took the helm in October 2008, it was too dangerous for teachers to patrol the grounds alone – they had to do it in pairs, with walkie-talkies. There were security guards manning the gates. Now, Manurewa Intermediate is a model of harmony, orderliness and high performance. The grounds and buildings are immaculate. The students are courteous, confident, articulate and justifiably proud of their school. Many still arrive in Year 7 with poor literacy and numeracy. But specialist teachers turn that around during the two intermediate years, and a large majority leave well prepared for secondary school. Manurewa Intermediate shows what is possible with the right leadership and approach.

**Henderson South School** in West Auckland also serves a community that struggles socioeconomically. Trevor Diamond (Principal), commented that the writing data for Henderson South School indicated that there was a large number of students struggling with this subject. The school applied for Professional Learning Development through the Ministry of Education to address this issue. He consulted with Dr Helen Walls, an accomplished teacher and one of New Zealand's leading experts on the teaching of writing. Dr Walls introduced the school to a structured approach to the teaching of this key skill. After adopting this approach, teachers noticed a substantial improvement in the children's engagement and achievement in writing almost straight away. There has also been a marked improvement in reading.

**Willow Park School** on Auckland's North Shore has adopted a structured literacy approach in consultation with experts from educational consults at Learning Matters. The approach integrates reading and writing and is strongly informed by systematic data collection and analysis. Following a trial in 2019, the approach has been rolled out across the school, with improvements now showing in the data despite the disruption caused by the pandemic. Teachers are excited by the progress the school has made. They have greatly increased the proportion of their students working above curriculum expectations in reading and writing.

CHAPTER 1

# The Education and Training Act

The *Education and Training Act 2020* lays out four objectives for school boards.[13] These are that schools: (1) enable students to attain their highest possible standard in educational achievement; (2) are physically and emotionally safe places for students and staff; (3) cater for students with differing needs; and (4) give effect to the Treaty of Waitangi.

The first objective is consonant with Beeby's vision that all New Zealanders should receive an education to which "they are best fitted and to the fullest extent of their powers." However, the other three stipulations are more accurately seen as strategies than as objectives, as Roger Partridge has argued.[14]

A school might provide a safe environment *in order* to ensure high educational standards – it is a potential strategy for achieving that paramount objective. In the Act, however, the latter three points are enshrined as having status equal to ensuring educational attainment. This risks boards focusing on strategies as if they were objectives. In appraising principals, as Partridge points out, they may reward the provision of safe and inclusive environments even if educational attainment in their school is poor. They may also overlook strategies not mentioned in the Act, but which might be as, or more, effective in raising achievement than those that are.

Naturally, schools should adopt strategies that will help with educational attainment, including safety and inclusivity. But these factors should not be elevated to equal status with educational attainment, which should be the primary objective of all schools.

### Proposal

The *Education and Training Act 2020* should be amended to enshrine a focus on educational achievement as the paramount objective of school boards. The other objectives stipulated in the Act should monitored by the Education Review Office (ERO) in its school reviews.

## CHAPTER 2
# Curriculum

Imagine a beginner teacher planning to teach correct syntax in writing to a Year 3 class. She consults Level 2 of the English curriculum in the NZC and finds the section titled "Structure". Under that heading is a single bullet point stating that children operating at Level 2 can "organise texts using a range of structures." This is followed by three indicators:

1. "uses knowledge of word and sentence order to communicate meaning when creating text"
2. "organises and sequences ideas and information with some confidence"
3. "begins to use a variety of sentence structures, beginnings, and lengths."

The teacher puts the curriculum in the bottom drawer of her desk and never looks at it again.

The centrepiece of any national education system is its curriculum. A curriculum sets out what is to be taught and learned, and describes expectations for students' achievement as they progress through the school system.

The NZC has two parts.[15] The first describes five 'key competencies': thinking; using language; understanding symbols and texts; managing self; and relating to others. The second lays out eight learning areas: English; the arts; health and physical education; learning languages; mathematics and statistics; science; social sciences; and technology. Each learning area is described in one or two pages. Later in the document, a number of bullet points specify learning criteria at each of eight curriculum levels, in each learning area.

The NZC has two principal flaws – its inadequate guidance for teachers in each learning area and its emphasis on key competencies. The term 'learning area' itself introduces a degree of confusion. The more traditional and specific term 'subject' would be clearer. As it is, some learning areas encompass several subjects. For example, the social sciences include geography, social studies, history and economics.

Most school subjects are derived from academic disciplines. The boundaries of these disciplinary subjects are not arbitrary; each has a body of knowledge and methods of enquiry developed by scholars over time. But the NZC ignores the different provenance and knowledge domains of each subject. In fact, it actively encourages schools "to design their curriculum so that learning crosses apparent boundaries."[16] Unfortunately, until students are familiar with the unique knowledge and methods of each discipline-based subject individually, the cross-curricular approach encouraged by the Ministry will likely continue to sow confusion.

Iain Taylor, Principal, at Manurewa Intermediate believes that the New Zealand Curriculum is far too loose. It needs more content, more structure and fewer irrelevancies. At Manurewa they have written their own curriculum, which includes such things as rote learning of times tables and correct spelling. The Manurewa Intermediate curriculum is far more detailed and rigorous than anything in the national curriculum. They marry this structure with innovative inquiry learning, proving that having the best of both worlds is possible.

## The representation of knowledge in the New Zealand Curriculum

Evolutionary and developmental psychologist David Geary has identified two types of knowledge, distinguished by the way each is acquired.[17] *Biologically primary* knowledge develops tacitly by interacting with the world and other people. Acquiring this knowledge is effortless because the human brain has evolved specific structures to acquire it. Oral language, thinking and social skills are all examples. Biologically primary knowledge does not need to be explicitly taught. Indeed, attempting to do so is ineffective. With the exception of using symbols and texts, all the key competencies described in the first part of the NZC are biologically primary.

### Secondary knowledge and academic disciplines

Secondary knowledge, in Geary's terms, can be reliably acquired only with explicit teaching and conscious learning. It is cognitively demanding to learn and is most effectively imparted via direct instruction from expert teachers. The subjects that comprise the learning areas of the NZC, as well as literacy and numeracy, all belong to the domain of secondary knowledge.

Treating secondary knowledge as if it were primary is arguably the most fundamental flaw of the 'child-led' pedagogy that is currently fashionable in our education system, especially in the primary sector. In this respect, the treatment of knowledge in New Zealand Curriculum is exactly backwards: It emphasises primary knowledge (key competencies), which does not need to be explicitly taught, and de-emphasises secondary knowledge (the learning areas), which needs explicit instruction. While children and adults with sufficient reading skill can acquire secondary knowledge from books, the most efficient and effective way to learn it is under the direct instruction of an expert teacher who holds that knowledge.

Some, although not all, secondary knowledge is appropriately classified as 'disciplinary', or 'academic' knowledge. It goes far beyond the knowledge young people usually learn in their families and communities. It therefore enables them to transcend the limitations of their familial, social and geographical backgrounds. By providing cognitive tools for testing truth claims, disciplinary knowledge leans towards the universal rather than the local. It is also important for equality of opportunity when students have completed their schooling.

School curricula should focus on subjects derived from disciplinary knowledge. This is not because all students need to be prepared to attend university, or because they will all become scientists, historians, mathematicians or professional musicians. It is because disciplinary knowledge provides the best basis for coherent understanding of the physical and social worlds, and for aesthetic self-expression. It is *powerful knowledge*, to use the terminology of Johan Muller and Michael F.D. Young.[18]

Many learning areas in the NZC – areas such as mathematics, science and the social sciences – correspond to *epistemic* disciplines, meaning that they are concerned with developing new knowledge. Others – English and the arts – correspond to *aesthetic* disciplines, which are refined modes of self-expression. Because the disciplines – whether epistemic or aesthetic – are sub-categories of secondary knowledge, they not only need to be taught, but to be directly taught by experts. Disciplinary knowledge is highly structured and conceptually complex. A teacher without sufficient expertise, both in a discipline itself and in the way its knowledge elements are structured and best sequenced pedagogically, is likely to leave students confused and demotivated.

A detailed and well-designed curriculum provides appropriate guidance for teachers who may have sound knowledge of a discipline itself, but less expertise in the pedagogy that will most effectively impart learning it to proficiency. This is especially important for primary school teachers, who are expected to cover the full range of the curriculum with very little specialist support.

Disciplinary knowledge is not well represented in the NZC. Apart from the revised New Zealand histories curriculum, very little content is prescribed. In the absence of specified content, the NCEA standards have become a *de facto* curriculum for Years 11–13, with deleterious effects on teaching and learning (see "Assessment for qualifications" below).

The lack of prescribed knowledge in the NZC allows for *ad hoc* approaches to subject content and muddled sequencing of learning, resulting in many students developing fractured and incomplete understanding. It also means that the learning experiences of students across the country are, inevitably, uneven. Content and depth both vary widely, exacerbating educational inequality. Because the curriculum provides so little guidance, teachers must become *de facto* curriculum designers. They must compile programmes of learning from their own knowledge and research. One consideration here is the proportion of teachers who have the expertise to do this. Another is the workload involved and whether the time spent on curriculum design could be better spent supporting students to learn.

Other countries, including Australia and England, have also experimented with skills- and competency-based curricula, without much specified knowledge. However, these countries have reverted to much greater specification. For them, the costs of that approach outweighed the purported benefits. It is time for New Zealand to recognise that our current approach is not serving us well either, and to design a national curriculum that will give our young people a sound grounding in disciplinary knowledge and thinking.

A suitable starting point for curriculum redesign in disciplinary subjects is Elizabeth Rata's Curriculum Design Coherence (CDC) model.[19] The model frames a subject in terms of concepts (structural elements); content (truth claims); and competencies (practical applications – this is not to be confused with the 'key competencies' described in the NZC).

The CDC model rejects both learning based on memorising dissociated content elements (content lists) and '21st century' skills-based learning. Instead, it uses the central concepts of each subject to ensure curriculum coherence. Concepts comprise frameworks that can be used to organise more specific content.

This way of arranging a subject for pedagogical purposes helps overcome some of the limitations of human cognition, identified by Cognitive Load Theory.[20] In particular, *working memory* – a short-term memory system that mediates conscious reflection on and mental manipulation of information – has a very limited capacity and is easily overloaded.[21] When this occurs during learning, confusion and frustration result. Mental structures known as schemata can mitigate the limited capacity of working memory by organising multiple cognitive objects into a single structure (a schema).[22] Thus, encoding schemata vastly reduces the cognitive load associated with processing new information. This happens by enabling the encoding of multiple, related knowledge elements as a single unit in working memory. A concept, under the CDC model, is a schema in cognitive terms. As such, the CDC approach is likely to reduce the high cognitive load associated with learning disciplinary knowledge.

Specialist literacy teachers at Henderson South School noted that cognitive load is a real problem with the methods of teaching writing that currently predominate in New Zealand. Children are asked to write freely, but they have no structure to support their creativity. If children are asked to write stories before they've developed skill in forming letters, they can't focus on the ideas they're trying to express. This becomes more and more of a problem as children get older and must use writing in the wider curriculum.

Under The CDC model, knowledge is applied situationally to develop practical competencies based in disciplinary knowledge. However, application *follows* subject understanding, rather than preceding it. Again, this approach helps manage cognitive load by ensuring that the conceptual structure and content detail of a topic is learned deeply before using it to appropriately guide action. This contrasts with constructivist pedagogies under which conceptual understanding is posited to emerge from 'real world' problem-solving. However, this leads to overloading working memory, which must simultaneously grapple with both a concept and the 'real world' context in which it is to be applied.

Rata distinguishes academic knowledge from socio-cultural knowledge, the latter being knowledge acquired in families and communities.[23] Much socio-cultural knowledge is biologically primary, although not by definition. Primary knowledge is ultimately defined cognitively rather than sociologically; the substantive distinction between primary and secondary knowledge is the presence or absence of innate mechanisms for its acquisition.

### Biologically primary knowledge

Setting aside brain injury and certain congenital disorders, human beings naturally acquire biologically primary knowledge – including thinking processes, oral language and social skills –provided appropriate stimulation is present (e.g., language being spoken in the presence of a child). It is therefore unnecessary and ineffective to directly instruct children in primary knowledge. Yet, as noted above, all the key competencies given prominence in the NZC, except using symbols and texts, reflect biologically primary knowledge.

All children acquire primary knowledge, but not all acquire it with the same level of sophistication or in optimally adaptive ways.

While *predispositions* to acquire primary knowledge are innate, the specifics depend on the nature and quality of a child's interaction with his or her environment.

Children vary cognitively, and their home and community environments vary in the kinds of stimulation they provide. Almost all children acquire oral language, but some acquire larger vocabularies and more sophisticated expressive capabilities than others. Almost all acquire schemata for social interaction, but some acquire predominantly pro-social schemata and others, predominantly anti-social schemata. This variation contributes to inequality in the educational opportunities afforded by school. For example, children who start school with poor oral vocabularies are disadvantaged in acquiring literacy. Schools can mitigate this kind of disadvantage by promoting young people's acquisition of biologically primary knowledge.

Manurewa Intermediate exemplifies the way in which biologically primary knowledge is best embedded in the school environment. There is an ethos of peaceful interaction that is modelled by teachers and strongly upheld by students. As Principal Iain Taylor says, a peaceful environment is one in which students learn well. The school is characterised by an atmosphere of relaxed order. While we were being given a tour by two Year 8 girls, one of them paused to pick up an isolated item of litter. Iain Taylor told us, "Rubbish is a metaphor for how we think about, and take care of, the environment". By establishing such an orderly and peaceful environment, the key competencies of 'managing self' and 'relating to others' are promoted, while barely being mentioned explicitly, let alone being part of the formal curriculum.

Henderson South School places a strong emphasis on developing children's oral language skills and confidence. There is a particular emphasis on listening skills. This is approached through teacher modelling rather than explicit teaching. They also give students opportunities to speak publicly, which develops their confidence. Their approach to oral language is consonant with its nature as biologically primary knowledge. Rather than attempting to teach it directly, it is modelled, and the school establishes an oral-language rich environment.

By providing environments in which children are exposed to rich oral language, schools improve children's vocabularies and the sophistication of their verbal expression. By modelling clear thinking and argumentation, and providing knowledge-rich education, teachers assist children to develop sound thinking processes. A school environment with clear rules requiring respectful conduct helps ensure young people assimilate pro-social rather than anti-social schemata. Sound and coherent approaches to teaching disciplinary knowledge improve the sophistication of primary knowledge, especially that of thinking, planning and acquiring oral language.

Notwithstanding the role of schools in young people's acquisition of primary knowledge, placing it in the foreground of the NZC as key competencies is a distraction. Doing so suggests that primary knowledge needs to be made pedagogically explicit. To the extent that schools emphasise explicit inclusion of key competencies in their educational programmes, they detract from teaching time that could be deployed more usefully on secondary knowledge, which does need to be explicitly taught.

Instead, biologically primary knowledge should be tacit in the social environments of schools – in codes of conduct, expectations for self-management, and teachers promoting the use of rich oral language, to give some examples. Trainee teachers should learn about biologically primary knowledge and its importance in preparing children to learn secondary knowledge. This will enable them to create environments in which children readily acquire sophisticated and adaptive primary knowledge. This, in turn, will mitigate inequality in the opportunities school presents to learn secondary knowledge. Teachers should also learn that biologically primary knowledge must be modelled rather than explicitly taught. If the curriculum is to specify this knowledge at all, it should do so much less prominently than the 2007 curriculum does, and also make clear the conditions in which it is best acquired by students.

## Literacy and numeracy

Literacy and numeracy are foundational to accessing the disciplinary subjects. At present, our education system is performing abysmally in these key areas. Recent data from the Ministry of Education suggest that a third of 14-year-olds lack the reading and numeracy skills required to keep pace with work and life in a modern economy and society. The situation is worse in writing, with up to two-thirds falling short of a basic adult standard. Similar proportions of Year 8 students fall short of curriculum expectations in NMSSA data.[24] International tests such as PISA have shown ongoing decline in the literacy and numeracy of New Zealand's young people for two decades.[25]

Senior staff at Henderson South School emphasised the importance of handwriting, not only as a component of learning to write, but also as a boost to reading. They emphasised the importance of mastering the basics – letter formation, speed and spacing.

The decline in literacy and numeracy performance may be attributed to ineffective teaching in primary school. Videbeck gives a succinct account of the issues in literacy education.[26] He has summarised research evidence showing that a 'structured literacy' approach, based largely on scientific work in cognitive psychology, is the most effective pedagogy available to teach reading. Helen Walls and Michael Johnston showed that a structured approach to writing, with frequent and specific feedback, can accelerate the progress of students who have fallen behind curriculum expectations.[27] Olwyn Johnston showed that a structured literacy approach can substantially accelerate older children who had previously struggled with learning to read.[28]

Walls, a New Zealand expert on early-years writing pedagogy, points out that handwriting and spelling are neglected areas in our schools.[29] She cites neuroscience research showing that handwriting, and not the use of letter tiles or typing, activate brain regions associated with forming spelling-sound mappings. Thus, handwriting is an important component of learning to read, as well as an important skill in its own right. Yet, handwriting, as Walls has observed, is neglected in school pedagogy. A report from ERO in 2009 found that almost no teacher professional development is conducted in handwriting pedagogy.[30] A survey of teachers conducted by Belinda Blick-Duggan, a literacy expert and accredited consultant with Cognition Education, showed that 66% of participating teachers qualified prior to 2000 had received training in handwriting pedagogy.[31] This compared with 29% of those trained between 2000 and 2009, and just 12% of those trained in 2010 or thereafter.

A recent Royal Society Te Apārangi report suggested that many primary school teachers lack the mathematics knowledge needed to teach numeracy effectively.[32] As a result, teachers may rely too heavily on the numeracy project to support their pedagogy.[33]

Trials of new literacy standards for NCEA in 2022 showed that only about two thirds of our Year 10 students can read at a basic adult standard. In writing, the results were much worse – only a third met the standard. At Willow Park School, their structured literacy approach, which integrates reading and writing pedagogy, is closing the gaps between these skills. Another important gap that is closing at Willow Park, is the one between the highest- and lowest-achieving students. Their data show that the approach is especially successful with students who struggle with literacy.

Dr Helen Walls has developed the 'fast feedback' method of teaching writing to primary-aged children. Under the fast feedback approach, children are each given a short-term goal for their writing, for example, to leave spaces between words; to read and check every sentence; or to write a narrative and include the elements of setting, characters and a problem. The learning goals are modelled each day, and students practice them with support. Towards the end of a lesson, teachers and students engage in the short and structured 'fast feedback' conference. During this conference, teachers provide verbal feedback on the goal and create a visual display for the students, tracking their progress over days and weeks – until the goal is consistently achieved. The method is grounded in the science of learning. Dr Walls' PhD research demonstrated its effectiveness in a controlled study. Children made much faster progress with their writing when fast feedback was used, than comparable children in a control group. They also demonstrated enhanced motivation and focus during writing lessons. An article reporting on the trial has been published with *The Australian Journal of Learning Difficulties*.[27]

The numeracy project was originally designed as professional development but has, over time, become a *de facto* numeracy curriculum in primary schools. Patterson says the numeracy project places too little emphasis on automatising number knowledge.[34] For many students, this means the cognitive load associated with performing trivial calculations leaves insufficient cognitive resources available to progress in numeracy fast enough to develop basic adult proficiency.

Senior staff at Willow Park School commented that their impressive improvements in literacy wouldn't have happened without professional development support from Learning Matters. The school successfully applied for funding for this professional development. But not all schools are successful in being granted funding for training like this. Learning Matters itself has only recently become a Ministry-accredited provider of professional development. All of our schools need access to this essential knowledge.

## Biculturalism and the curriculum

A complexity of school curricula in New Zealand is a commitment to a bicultural education system that represents both universal disciplinary knowledge and Mātauranga Māori (Māori cultural knowledge). The Ministry is pursuing a 'refresh' of the curriculum, in part to infuse all learning areas with Mātauranga Māori. This is misguided: Mātauranga Māori is fundamentally different than universal disciplines in at least two important respects.

The first is that Mātauranga Māori is concerned principally with local and specific phenomena, whereas universal disciplines are concerned with abstract and generalisable theories. A second and even more important difference is in the ontological basis of the two bodies of knowledge. The universal disciplines that facilitate understanding of the material world – the physical sciences – are predicated on a materialist ontology; scientific theories do not employ metaphysical explanations. Furthermore, all truth claims are subject to testing and falsification – there are no sacred claims. In contrast, Mātauranga Māori does not explicitly distinguish the sacred from the secular. Consequently, explanations of physical phenomena often refer to supernatural or mythological entities. Some explanations are either unfalsifiable or held to be sacred and thereby insulated from empirical testing.

Examples of the confusion that can arise when attempting to position Mātauranga Māori within a universal discipline can be found in the draft materials for Level 2 NCEA Statistics.[35] According to the 'Big Ideas' section of the document, "Observations can be transformed into data which has whakapapa and is a taonga" and "observations … carry mauri." The standards writers are claiming that data have a lineage and observations have life force. From a scientific perspective, these ideas are meaningless because they are unfalsifiable. Furthermore, the authority on which these statements are based is unclear. The standards writers are not speaking as scientists and Māori scholars such as Durie would not necessarily agree with their approach either (see Introduction).

The assertion that data are also sacred (taonga) is especially disturbing. It seems explicitly to conflate data-based research with sacred ideas. At best these conflations are incoherent. At worst, they will result in insulating at least some claims from rigorous testing and deprive students of some of the information value of the observational record.

Because of their different epistemic foci and ontological bases, universal disciplines and Mātauranga Māori are insufficiently compatible to be taught or learned in an integrated manner. Mātauranga Māori should be represented in its own curriculum area, accessible to all students.

## The curriculum 'refresh'

In September 2022, the Ministry of Education published *Te Mātaiaho: The Refreshed New Zealand Curriculum*.[36] This document is a draft framework released for consultation. The final refreshed curriculum is scheduled for release in 2025.

Te Mātaiaho promises some movement towards better approaches, especially in early-years literacy and numeracy. However, it also perpetuates many of the misguided ideas characterising the 2007 curriculum and may introduce new ones.

The draft framework sets out key areas of focus for learning at different stages of schooling. Encouragingly, the focus of provision for Years 0–3 is "environments rich in literacy and numeracy,"[37] and signals movement towards a more structured pedagogical approach.

Another positive development is a somewhat greater specification of knowledge than is evident in the 2007 curriculum. The expectations for the knowledge to be attained at each year level are still being developed for most learning areas, but Te Mātaiaho contains a full draft of the expectations for mathematics and statistics.

To take an example, the Level 2 expectations for mathematics and statistics in the 2007 curriculum comprise 11 headings – examples include *number knowledge* and *shape* – each with one to four bullet points providing little guidance. For example, *number strategies* stipulates that students should be able to "use simple additive strategies with whole numbers and fractions," but does not specify what those strategies are. The Year 3 (Curriculum Level 2) expectations in Te Mātaiaho include more detail, for example, students should be able to "solve addition and subtraction problems with two- and three-digit numbers."

Despite the additional detail about expected knowledge, it is not clear whether Te Mātaiaho will provide enough guidance for teachers to ensure children meet these expectations. Te Mātaiaho at this stage lacks any advice to teachers on how best to sequence learning, or to manage cognitive load and ensure that foundational knowledge is solidly acquired before being built upon. Many of the statements (e.g. "generalise the properties of addition and subtraction") remain as vague and underspecified as those in the 2007 curriculum. Nonetheless, the greater detail provided in Te Mātaiaho is a step in the right direction.

Less encouragingly, Te Mātaiaho maintains a strong focus on the five key competencies of the 2007 curriculum, and in some ways highlights them even more. The refreshed curriculum promises to be "centred around positive and inclusive relationships, connectedness, and a sense of belonging."[38] This elevates two of the key competencies – "relating to others" and "participating and contributing" – to paramount status. While schools should be places that foster good relationships and students' sense of belonging, these attributes should not be *central* in a curriculum. A curriculum should set out the explicit knowledge schools are expected to teach and students are expected to learn.

Another misguided feature of the 2007 curriculum that may be continued under the curriculum refresh is an overemphasis on local knowledge. Te Mātaiaho lays out eight elements of its "whakapapa."[39] One of these is "to focus on local curriculum." This is elaborated as an "obligation to learning through relationships with mana whenua and local communities." There is no element of the whakapapa that similarly emphasises the importance of universal disciplinary knowledge.

Another issue, related to localism, is that Te Mātaiaho insists on infusing Mātauranga Māori into every learning area. This raises new problems not explicit in the 2007 curriculum. As discussed previously, the different ontological and epistemic bases of the universal disciplines and of Mātauranga Māori are such that attempting to fuse them will confuse both.

Overall, the authors of Te Mātaiaho appear to have two mutually contradictory aims. On one hand, they are signalling tentative steps towards supporting knowledge specification and structured learning. On the other, Te Mātaiaho retains the failed and overly socio-cultural approach of the 2007 curriculum. Its emphasis on literacy and numeracy in the early years is welcome, although it provides no detail on what needs to change to resolve the current malaise in those domains.

What we need is not a 'refresh' of the 2007 curriculum, but a completely new curriculum with universal secondary (disciplinary) knowledge at its heart.

## Proposals

1. A new curriculum is needed. It should emphasise disciplinary *subjects* – a more specific and epistemically meaningful term than *learning areas* – much more than the 2007 curriculum does. What is to be taught at each curriculum level should be better specified, with guidance for teachers on the sequencing of learning should be provided. All New Zealand students would learn this specified knowledge. It would form a 'common core', irrespective of any local variation.

2. Key competencies should be de-emphasised in the new curriculum. This is not because they are unimportant, but because, with the exception of *symbols and texts*, they do not need to be directly or explicitly taught. Instead, schools should be advised on creating environments that foster the acquisition of adaptive biologically primary knowledge. During their training, teachers should also learn about the acquisition of primary knowledge and establishing learning environments conducive to acquiring it in educationally and socially adaptive ways.

3. Literacy and numeracy are foundational skills that enable access to the wider curriculum. Any new curriculum should specify detailed progressions based on structured literacy and numeracy pedagogy. These progressions should extend throughout the school curriculum, although they may be at least partly subsumed by literate and numerate disciplinary subjects at secondary curriculum levels. The progressions should include a focus on handwriting.

4. A new curriculum should represent Mātauranga Māori and universal disciplines separately rather than trying to integrate them in the same subjects. Both should be available in English and Te Reo Māori so both bodies of knowledge are accessible to all young New Zealanders.

## CHAPTER 3
# Assessment for Qualifications

This chapter reviews the current state of the National Certificate of Educational Achievement (NCEA) qualifications system. The focus here, which is on assessment for qualifications purposes, is not intended to downplay the importance of formative assessment. Indeed, the most important use of assessment at any educational level is to provide feedback that shapes future learning. New teachers in New Zealand do not receive enough training in the formative uses of assessment (see Chapter 3). Nonetheless, credentialling is also important and, for qualifications to be credible, the assessment for them must be reliable and valid.

The NCEA has been New Zealand's main system of school credentialing for nearly 20 years, having been implemented progressively between 2002 and 2004. It has never quite settled into a business-as-usual mode of operation, with many adjustments, both major and minor, since its inception.

In most secondary schools, the last three years of schooling are dominated by NCEA. It is a well-known educational adage that high-stakes assessment systems like NCEA tend to drive both the curriculum (what is taught) and pedagogy (how it is taught). The under-specification of the NZC regarding disciplinary learning greatly exacerbates the influence of the qualifications system in both respects: The NCEA achievement standards constitute a *de facto* curriculum for Years 11 to 13; and the disaggregated nature of its assessment processes drive a fragmented and often-superficial approach to teaching and learning.

Even before NCEA was implemented, prominent education academics warned of major impending problems. Professors Warwick Elley, Cedric Hall and Reg Marsh argued that the structure of the qualification, with multiple standards in each subject (many of them internally assessed), would result in egregious variability in achievement rates – between standards and subjects, and over time. They further warned that such an approach would be inefficient, result in overassessment, and damage curriculum coherence.[40]

The warnings went unheeded. Following a crisis in early 2005, largely caused by the kinds of variability the professors had predicted, the State Services Commission wrote two reports, both highly critical of the New Zealand Qualifications Authority (NZQA).[41] The chief executive and Board Chair of NZQA resigned, much of the senior management was cleaned out, the organisation was restructured, and the professors were vindicated.

Between 2005 and 2011, new Deputy Chief Executive Bali Haque led major reforms of the qualification system, with technical advice from prominent academics, including Professors Terry Crooks, John Hattie, Cedric Hall and Jeff Smith. These reforms addressed most of the technical problems – particularly those that had caused the variability. They did not, however, address the more fundamental effects of the highly disaggregated assessment model on teaching and learning.

A salient effect of this approach to assessment was to establish the standards, which are designed simply to be units of *assessment*, as *curriculum* units. A typical approach to an NCEA course is to teach the content associated with each of a set of standards in sequence. Usually, a discrete assessment immediately follows the teaching of each internally assessed standard.

This approach has several detrimental effects on students' learning. Connections between the knowledge addressed in one standard and the knowledge addressed in another tends not to be considered, even if it's highly related. For example, in mathematics, there are important connections between geometry and graphing. However, if geometry and graphing are represented in different standards and taught at different times of the year, those connections are unlikely to be given much attention. Because standards are highly circumscribed in the knowledge they assess, with no assessment of connections between different standards, the assessments themselves provide no incentive to make those connections.

A related problem often arises when the knowledge covered in a standard is fundamental to knowledge covered in others, and to progress in the discipline more generally. When fundamental knowledge is isolated in one standard and treated as a *de facto* curriculum unit, it may not be given the consistent coverage its foundational nature requires. To use a mathematics example again, algebra is foundational knowledge to advance in most aspects of mathematics. If it is taught as part of a single standard, then assessed, and not revisited in any detail (because standards taught later in the year do not make specific reference to algebra in their assessment criteria), it is unlikely that students will practice algebra enough to robustly support progress.

In addition to fragmenting teaching and learning, the nature of assessment processes for internal assessment encourages learning that is too superficial to support further learning. Teachers have incentives to 'coach' their students towards success in internal assessments, sometimes to an extent that leaves the authenticity of students' learning questionable. Furthermore, assessments themselves are often too brief to provide assurance that a students have learned foundational knowledge deeply enough to support further learning.

The disaggregation of internal assessment, and the practice of awarding credits as soon as a teacher has graded a student's assessment at *Achieved* or higher, motivates students and teachers to focus more on accumulating credits than on deep understanding of curriculum content. There are 40 weeks in the school year, the last six of which, for senior secondary students, might be spent preparing for, and undertaking external assessments. If there are no internal assessments in, say, the first six weeks, that leaves 28 weeks during which internal assessments might be submitted. Each subject is likely to include about four internally assessed standards. So, if a student undertakes five subjects, he or she will be, for a large part of the year, submitting an assessment nearly every week and receiving a grade just as often. This barrage of assessments and grades drives the credit accumulation mentality, exacerbating the problem of superficial learning.

An especially pernicious problem with awarding credits during the year is that many students aim for target numbers of credits – to achieve qualifications, course endorsements, or certificate endorsements – that are often short of the total number of credits assessed. Having attained their target, some students then disengage from further learning, having satisfied themselves that they have attained 'enough' credits. While they have indeed met their target, the foregone learning leaves gaps in their knowledge, often hindering later progress. These gaps may also arise from omissions in the standards schools choose to assess.

A final issue for teaching and learning under NCEA, shared by most formal assessment systems, is a potential mismatch between modes of assessment and the cognitive processes that must be engaged to learn different types of knowledge. This relationship is quite a new consideration in the research literature.

There is evidence that the sciences and the humanities differ in respect of the kinds of assessment that are most predictive of later achievement. Performance in first-year university humanities courses has been shown to be much more strongly predicted by prior performance in internal assessments for NCEA, than by performance in external assessments. University courses in science and mathematics showed a converse effect – external assessments for NCEA were much stronger predictors of performance than internal assessments.[42]

Assessment modalities should be chosen so as to optimise the learning of target knowledge. This means engaging the cognitive processes that enable the knowledge to be encoded and deployed most authentically. For example, simple algebraic procedures should be assessed by time-limited examination. A time restriction motivates students to learn them to the point of automaticity, which is what is needed to support further learning. On the other hand, assessments that require originality or insight should not be time-limited but allow sufficient time for reflection. The mix of internal and external assessments in NCEA offers an under-exploited opportunity in this regard.

Most of the serious technical problems evident early in the implementation of NCEA were satisfactorily addressed by 2011, at least for external assessment. But grade inflation for internally assessed standards remains a problem. *Excellence* grades, in particular, have increased markedly over the past decade. *Excellence* endorsements of Level 3 Certificates have climbed from 8.2% in 2012, to 17.9% in 2021.[43] While variability in external assessment is reined in by using profiles of expected performance[44] and grade-score marking,[45] the *post hoc* moderation system for internal assessment[46] does not have nearly enough influence to counteract the incentives in the system driving grade inflation.

Changes announced following a review of NCEA initiated in 2018 will go some way towards addressing the fragmentation of teaching and learning. The number of standards in each subject will be reduced to four – two internally assessed and two externally assessed. Students will have to complete fewer assessments. However, incentives encouraging a credit accumulation mentality and superficial learning are likely to persist for as long as credits continue to be awarded during the year.

## Proposals

1. In each subject, curriculum content should be divided into that which is best assessed (1) in a time-limited examination, and (2) using another assessment mode. The former should then be assessed in a single examination for each subject at the end of the school year. The latter should be assessed in whatever way best suits the knowledge in question – examples include essays, laboratory reports and research projects.

   Internal assessment should be as integrative as possible, meaning that it should be used to bring together the year's subject content. Work might be carried out over a long period and submitted at the end of the school year. Teachers should provide feedback supporting learning, following guidelines ensuring that submitted assessments are authentically a student's own work.

2. All assessment, internal and external, should be marked and graded at the end of the school year by marking panels convened by NZQA. Both should use profiles of expected performance and grade score marking to control variability. No grades should be reported during the school year.

## CHAPTER 4
# Initial Teacher Education

To reliably support students to make sound educational progress, teachers need to hold knowledge and competence in five key areas:

1. mastery of the knowledge they are to teach;
2. understanding of key pedagogical principles from the science of learning;
3. knowing how to deploy their pedagogical knowledge so students meet learning objectives;
4. understanding of how to use assessment information formatively – that is, to support effective feedback to students; and
5. developing the ability to form and maintain trusting and respectful relationships with students, including appropriately adapting pedagogy to take account of students' individual and cultural characteristics.

At present, Initial Teacher Education (ITE) focuses strongly on interpersonal and socio-cultural factors (5). It also focuses on substantive knowledge (1); assessment literacy (4); and pedagogy (3), although the pedagogical approaches it promotes are often ineffective. This is largely due to the near-complete absence of any focus on the science of learning (2), from which sound pedagogy follows.

Qualifying as a secondary school teacher in New Zealand requires a three-year undergraduate degree followed by a specific postgraduate teaching qualification. The latter course of study usually lasts a single year. Prospective primary school teachers can also qualify with a three-year general degree followed by a one-year teaching qualification. Alternatively, they can undertake a three-year undergraduate teaching qualification.

After graduating, prospective teachers must register with the Teaching Council. The requirements for registration[47] include agreeing to abide by the Teaching Council's *Code of Professional Responsibility* and *Standards for the Teaching Profession*, both laid out in a single document.[48] The code lists commitments to the teaching profession, learners, families and whānau, and society.

Each commitment has several elaborations. Of these, only "demonstrating a commitment to providing high-quality and effective teaching" refers specifically to using effective pedagogy. None of the six elaborations of "Commitment to Learners" entails ensuring that those learners make educational progress.

In addition to its registration criteria, the teaching profession has six standards:

1. Te Tiriti o Waitangi partnership;
2. professional learning;
3. professional relationships;
4. learning-focused culture;
5. design for learning; and
6. teaching.

Again, each standard has several elaborations, some of relate to ensuring that students learn.

The Professional Learning standard requires teachers to:

> … be informed by research and innovations related to content disciplines; pedagogy; teaching for diverse learners, including learners with disabilities and learning support needs; and wider education matters.

The Design for Learning standard stipulates that teachers must:

> … select teaching approaches, resources, and learning and assessment activities based on a thorough knowledge of curriculum content, pedagogy, progressions in learning and the learners [and] gather, analyse and use appropriate assessment information, identifying progress and needs of learners to design clear next steps in learning.

The Teaching standard exhorts teachers to:

> … teach in ways that ensure all learners are making sufficient progress, and monitor the extent and pace of learning, focusing on equity and excellence for all" and to "use an increasing repertoire of teaching strategies, approaches, learning activities, technologies and assessment for learning strategies and modify these in response to the needs of individuals and groups of learners.

These elaborations address (1), (3) and (4) from the five knowledge and competence areas needed by effective teachers listed above. Several other elaborations address (5). Again, though, what is missing is area (2) – knowledge of and ability to apply the science of learning. As a result, many elaborations designed to ensure high-quality teaching are likely to be ineffective. While teachers are required to be informed by research, the research itself need not be scientific. This opens the door to non-generalisable, non-replicable or anecdotal (qualitative) studies. While teachers may "select teaching practices … based on knowledge of curriculum content [etc.]," they are unlikely to select effective practices if they have no science-informed pedagogical knowledge. Consequently, teachers are unlikely to have a knowledge base that enables them to meet the requirement to use effective teaching practices, as required by the teaching standard. Similarly, knowledge of assessment is not necessarily adequately covered in Initial Teacher Education programmes. Therefore, many graduates will not adequately fulfil the elaboration of the Design for Learning standard requiring teachers to use assessment information to inform teaching practice.

Greater specificity in the *Code of Professional Responsibility* and *Standards for the Teaching Profession* is required to ensure that ITE programmes prepare teachers-in-training with the knowledge and competence in the five areas listed above.

Most teacher training in New Zealand comes from a sociological perspective – it emphasises learning as a social phenomenon and places little emphasis on the universal learning mechanisms of the human brain. While this perspective has its place, its dominance has arguably damaged pedagogy. It may, for example, be responsible for the emphasis on collaborative learning in New Zealand schools. While an ability to collaborate is important, children also need certain skills and knowledge on an individual basis. More generally, sociological hegemony in teacher education is probably responsible for the socio-constructivist and socio-cultural pedagogy in our schools. Socio-cultural theories, in particular, posit that the ways in which children learn is relative to their cultural backgrounds.

Willow Park School runs regular seminars throughout the year. They introduce them to the science of learning and how it informs their structured approach to teaching literacy. When students first start at Willow Park school there is an evening for their parents, to explain the science of reading and the approach to literacy learning at school. The teachers also understand the science of learning and explain it to their students. That helps all concerned to understand why they are using this approach.

The current approach to ITE needs to be balanced with more weight on the scientific understanding of the universal aspects of human learning. Human memory and attention systems do not vary across cultures. Just as all human beings have hearts, lungs and livers, they all have short- and long-term memory systems. They all have the same attentional systems and are all subject to cognitive load when learning new things. At the cognitive level the cultural backgrounds of children make little, if any, difference to the ways in which they learn.

Willow Park School now take account of what candidates know about structured literacy when they recruit new teachers. They ask about their experiences with structured literacy, their knowledge of the science of reading and how they would plan a literacy lesson. Willow Park also has an induction process to make sure all of their teachers are well versed in the methods when they start at the school. If teacher training focussed on the science of learning, the recruitment process for effective literacy schools like Willow Park would be made easier.

## Pedagogy based on science of learning

At present, most ITE providers are ignoring the implications for teaching, of the cognitive processes involved in human learning. Teachers' lack of knowledge in this area is arguably the greatest weakness in our education system. It has with profound implications for teaching skills like literacy and numeracy, and much more.

Cognitive Load Theory is an especially important aspect of the science of learning for developing the pedagogical skills of teachers.[49] A central insight from Cognitive Load Theory is that the limitations of *working memory* have important implications for learning.

Working memory is a short-term memory system with a role in most human learning, especially in learning *secondary knowledge* (see "Curriculum" above).[50] Loosely, working memory holds the contents of consciousness – whatever we are attending to at a given moment. It is the cognitive system that maintains information in awareness while we reflect on and mentally manipulate it. Information enters working memory either from our sensory systems such as vision and audition, including language, or from long-term memory.

Everything we consciously learn must be processed by working memory. It stores information when we first encounter it and while we rehearse or work with it. When knowledge has been sufficiently processed in working memory, it is stored in long-term memory. Thus, working memory has a very central role in learning.

Teachers need to be aware of the limitations of working memory. It has a very small capacity and decays quickly unless the stored information is maintained by attention and rehearsal. Its capacity limitations may be mitigated by 'chunking' information into information structures known as *schemata*.[51] Briefly, schemata organise multiple related items of information so they may be stored as one in working memory, rather than as individual items.

The learning of skills such as arithmetic and reading also heavily involve working memory. For example, when a child is working out seven plus four, he or she must hold representations of each of those numbers in working memory, while applying a strategy to add them. When a child is first learning to read and encounters the word *shin*, for example, he or she might hold representations of its graphemes ('sh', 'i', 'n') in

working memory, and retrieve from long-term memory the sounds associated with each. These too must be stored in working memory while they are blended to form the sound of the whole word.

As knowledge becomes familiar over time, it is organised into conceptual schemata and stored in long-term memory, which has practically an infinite capacity and is highly durable. Similarly, practising arithmetic and reading automatises them, so that they no longer rely on working memory. For example, reading is much more onerous for a beginning reader than for a skilled reader. From a cognitive perspective, learning may be defined as the encoding of schemata in long-term memory and the automatisation of cognitive processes.

Knowledge of Cognitive Load Theory would be of clear benefit to teachers. Indeed, ensuring that teachers have a strong understanding of Cognitive Load Theory and other key aspects of the science of learning, and the methods by which this knowledge can be applied to classroom practice, may be the single most effective measure we to improve teaching and learning in our schools. Yet, at present, very few ITE providers have any focus on the science of learning.

Willow Park literacy leaders commented that it isn't evident that universities are training teachers in the science of reading. Associate teachers, who mentor teachers-in-training during their classroom placements, are usually not versed in the science of learning themselves. As a result, newly trained teachers are spending the first few years at Willow Park learning on the job. This results in a lot of pressure during teachers' first couple of years in the classroom.

## Assessment literacy

Assessment literacy is another important area that needs more attention from ITE providers. Teachers would benefit from deeper knowledge of how to shape learning by using assessment and feedback, using assessment data to monitor learning over time, and collecting and analysing assessment data by teachers to improve their practice. Secondary teachers need a course on how to structure NCEA courses, and how to manage assessment in them without undermining students' learning motivation.

An important component of the move towards structured literacy at Willow Park School has been the use of test data to monitor the improvement. Teachers are excited to see their data. One literacy leader commented that, "I've never had so many kids who are working above curriculum expectations. It's amazing!". The data collection and monitoring means that children who will struggle with literacy can be picked up as early as the end of Year 1. This allows targeted intervention before the problem becomes too advanced.

There is more focus in ITE on assessment than on the science of learning. Even so, given its powerful potential to either enhance or undermine education, depending on how it is used, it should receive far greater attention in teacher training than it does now.

## Amending the Standards for the Teaching Profession

The most effective mechanism to ensure a focus on the science of learning and assessment literacy would be to require new teachers to demonstrate knowledge and competence in these areas to be registered with the Teaching Council. Specifically, reference to such knowledge and competence

should be included in the Teaching Council's "Standards for the Teaching Profession."[52] This would provide a strong incentive to ITE providers to ensure that their graduates are equipped to apply powerful insights from both areas to their practice.

For example, the elaboration in the Professional Learning Standards requiring teachers to use research-informed practice could be amended to require that research to be generalisable, replicable and include quantitative evidence. Codicils to the standards could provide considerable elaboration of the requirements to ensure ITE providers understand the need to inculcate science-informed pedagogy.

## Specialisations for primary teachers

There is a case for greater teacher specialisation at the primary school level. At present and historically, primary teachers have been expected to teach the whole curriculum. As part of their training, they could choose, say, three specialisations from literacy, numeracy and mathematics, science, social studies, visual arts, performing arts, physical education, and technology. These specialisations might be especially deployed in the upper primary school: Years 5–8. For younger children, the benefit of a primary relationship with a single teacher may outweigh the benefits of having several, more specialist, teachers.

At Manurewa Intermediate, the best of secondary and primary teaching is brought together. Principal Iain Taylor told us that most primary teachers are great at the art of teaching, but that the subject knowledge can be lacking, especially in science and mathematics. Manurewa employs a range of specialist teachers who are also skilled in the art of teaching. Students have a home room, but a different teacher for each subject, within an integrated-topic approach.

Primary teacher specialisation may require timetable changes in primary schools. For example, rather than having a single teacher for the entire day, learning time could be split into, say, three blocks of about one-and-a-half hours each. In addition to the benefit of the greater expertise brought by specialist teachers, this approach would promote better curriculum coverage.

A key part of the success at Willow Park in raising literacy achievement has been to have a literacy coach. She is a classroom teacher who now has a dedicated role to raise literacy achievement across the school. She spends .6 of her time as a literacy coach and .4 as an across-school lead for Willow Park's Kāhui Ako. In that capacity, she works in classrooms to support children's literacy and to build teacher capability.

## ITE providers

When the special-purpose teacher training institutions were merged with universities, teacher educators were required either to undertake PhDs and establish themselves as researchers, or to leave the profession. A requirement to undertake research has nothing to do with quality teacher education. Time spent by teacher educators on research is largely a distraction from their core role.

Teacher educators should be research informed. They should not, however, have to hold PhDs or to be active researchers themselves. Academic teacher educators should, therefore, be able to opt out of being counted as academic staff for the Performance-Based Research Fund (PBRF).[53]

Re-establishing specialist teacher training institutions would introduce much-needed competition for the universities in ITE.

Unfortunately, the funding model used by the Tertiary Education Commission makes it onerous to establish teacher education institutions outside large tertiary institutions.

New Zealand does not have many specialist providers of teacher education. One exception is the New Zealand Graduate School of Education (NZGSE) in Christchurch. The NZGSE programme is a model of effective teacher education. Its approach is unique in New Zealand, with two salient differences from the approach taken by other providers.

Manurewa Intermediate Principal Iain Taylor believes that teachers must have a combination of character, competence and chemistry with their students. Competence can be developed, but chemistry and character are much more intrinsic to the person. Teacher training courses, he believes, should have much greater focus on the science of learning, and teachers should be proficient in using it in the classroom. Primary teachers in training also need much more preparation in subject knowledge.

First, and most fundamentally, the NZGSE has a clear definition of teaching based on practice supported by research evidence. Disturbingly, the Code of Professional Standards for Teaching, to which teachers are required to adhere by the Teaching Council of Aotearoa New Zealand, does not strongly reflect evidence-based practice, or clearly define quality teaching. The NZGSE definition is based on evidence and is tightly focused on classroom practice but the code is more ideological. It makes extensive, albeit abstract, reference to concerns such as social justice, commitment to the Treaty of Waitangi, and well-being. Ironically, these concerns would be best addressed by sound teaching practice. That, therefore, is what the code should focus on, much more squarely than it does.

The second difference is in the mentoring of student teachers during their practicum placements in schools. The standard model engages teachers in those schools as mentors for teachers-in-training. The quality of mentoring varies – both in the practice being modelled and the level of engagement with teachers-in-training. Some teachers-in-training are neglected by mentors or inculcated with poor practice.

The NZGSE has created a specialist role of *teacher educator*. Specialist teacher educators both mentor and tutor interns during their practicum placements, including in curriculum and academic knowledge. This ensures high-quality mentorship and strongly aligns the tutoring they provide with the clearer definition of teaching upheld by the NZGSE. This approach explicitly connects theoretical knowledge to practice. Teachers trained in conventional institutions frequently fail to bridge this divide due to the greater separation of course learning from practica.

The NZGSE also emphasises graduates being 'job ready'. It provides teachers-in-training regular opportunities to demonstrate required competencies, with an open-ended time frame. Some students complete the programme within a year, while others take longer.

The programme provides training in behaviour management and special needs teaching. It also prepares teachers to understand that a great deal of knowledge requires explicit instruction if children are to learn it reliably. Furthermore, NZGSE staff ensure that trainee teachers' classroom placements are monitored by people who understand the programme and are familiar with the students being monitored. This is not always the case in university programmes, which rely heavily on contract staff to monitor placements.

Another potential approach to ITE is an apprenticeship model. Under this model, prospective teachers would be trained entirely in schools and undertake short, in-service training

courses run by external providers. A caveat in the current environment, however, is the insufficient number of schools that could provide the necessary grounding in pedagogy based on sound evidence. While an apprenticeship model could be effective in theory, it is not viable in New Zealand until the culture of poor pedagogy promoted by the Ministry of Education has been overturned and there is a sufficiently large cadre of excellent teachers in schools to support it.

## Proposals

1. ITE should be reformed, with a much greater focus on knowledge of human cognitive processes and the implications of this body of knowledge for teaching and learning. Additional focus on the use of assessment to improve teaching and learning would also be highly beneficial. To drive these changes, teacher registration criteria and the Standards for the Teaching Profession will need to be amended to reflect this requirement. Most providers will need support to acquire expertise in this area.

2. The current malaise is partly attributable to a near monopoly in teacher training enjoyed by universities. Teacher educators should be released from academic publishing imperatives and focus more tightly on their core role. Barriers to competition in teacher education should be removed. New funding models should be adopted to make establishing specialist teacher education organisations much more straightforward.

3. ITE for primary school should include specialisation to improve the quality of teaching in each curriculum area and promote more comprehensive curriculum coverage.

4. Far too many teachers in our schools have been trained to use ineffective pedagogy. Training new teachers in effective approaches is essential, but deficits in the professional knowledge of already-practising teachers must also be addressed. This will take a major professional development initiative. Structured professional learning for practising teachers, based on sound scientific research, should be funded by the Ministry. While schools are free to purchase professional development of their choosing, the Ministry should only fund programmes based on generalisable, scientific research evidence.

## CHAPTER 5

# Teachers' career structure

The career structure of teachers in New Zealand is predicated on a 'time served' model: Salary increments are based on the time teachers have been in the profession – they do not reflect quality or professional contribution. This structure does not encourage highly effective and motivated young teachers to stay in the profession for the long-term. Neither does it signal to less effective teachers to improve or leave the profession; they are rewarded financially, irrespective of the quality of their practice.

Proposals for performance-based salaries have been fiercely opposed by teachers' unions. Their main argument is that performance is too difficult to measure to enable a fair process. They fear that performance measures would come down to the average gains students make on standardised tests. This would indeed be an overly simplistic approach, although student achievement should be taken into account. No promotions system is perfect but teaching is nearly unique in having no process for increasing remuneration other than 'time served'.

Manurewa Intermediate principal Iain Taylor laments the comparatively low status of the teaching profession in New Zealand. For too many, he thinks, going into teaching is not driven by a strong sense of vocation. Instead, it's a 'fall-back' career after going into something else first.

Two things are necessary for an effective performance-based promotions system. One is robust metrics that can support the process with objective evidence. The other is training to ensure that those making promotions decisions have the necessary skills to conduct performance evaluation. Ideally, a merit-based promotions system for teachers would be negotiated on a bipartisan basis (i.e., agreed to by both major political parties) with acquiescence from the teachers' unions. The political difficulty of bringing this about would be formidable and addressing it is beyond the scope of this report. Such a compact would probably involve a general improvement in teacher remuneration at all levels to secure union agreement.

Australia has implemented a four-stage career structure:[54] Graduate Teacher, Proficient Teacher, Accomplished Teacher, and Lead Teacher. To progress from one stage to the next, teachers must demonstrate how they meet the criteria of the relevant profession standards.[55]

In New Zealand, academic promotion in universities works on a similar basis. The four levels of the academic career structure are: Lecturer, Senior Lecturer, Associate Professor, and Professor. Academics apply for promotion by submitting evidence of the quality of their teaching, the quantity and quality of their research, and service to the university and academic community.

A model for the teaching profession similar to this four-tier structure was proposed in New Zealand in 2014 as part of the 'Investing in Educational Success' initiative under the Key government. It was implemented when Kāhui ako (Communities of Learning) were established. In addition to classroom teachers and principals, the four roles are: Lead Teacher, Expert Teacher, Executive Principal, and Change Principal. Lead Teachers work within their schools with open classrooms to enable other

teachers to observe their practice. The other three roles have cross-school responsibilities, with Change Principals being responsible for rescuing failing schools.

In *Teaching Stars: Transforming the Education Profession*, John Morris and Rose Patterson argued against Expert Teachers and Lead Teachers splitting their time between their home school and working across a community of schools. Instead, they argued, these positions ought to work solely across communities of schools to avoid diluting their effectiveness and overloading them. They, however, supported the model in concept.

The proposal here has a different aim – to establish a career structure for classroom teachers, albeit that appointment to a senior tier would carry some responsibilities outside the classroom. This proposal does not, however, involve cross-school roles or principal roles.

## Proposals

1. Effective teachers should be recognised through higher remuneration and status, using an approach similar to the four-tier structure in Australia. Like that model, promotions should be made on the basis of evidence against professional standards. Criteria should include:

    a. curriculum knowledge;
    b. knowledge of learning processes;
    c. ability to design and administer courses of study;
    d. engagement with colleagues and school communities; and
    e. evidence that students are making appropriate progress.

2. Promotions could be determined by committees comprising principals and senior teachers. A promotion committee could be established for each kāhui ako (community of learning), with its members drawn from that community. All members of committees should be trained in performance evaluation, with principals getting more in-depth training as part of their professional development.

3. As well as receiving greater remuneration, teachers at higher levels of the career structure should have greater responsibility. These responsibilities might include mentoring young teachers and student teachers. Even so, care must be taken not to overload them with duties that interfere with their core job of classroom teaching.

## CHAPTER 6
# Teacher supply

New Zealand is suffering from an acute teacher shortage. This is, in part, a cyclical phenomenon; unevenness in the distribution of age demographics of children over time causes fluctuation in the demand for teachers. The recent two-year border closure during the COVID pandemic has not helped. However, other more structural factors are also in play. The teacher force, like the endemic population more generally, is ageing. Baby boomers are retiring *en masse*. Teachers are perennially in short supply in areas such as science, mathematics and technology.

Adopting a more sophisticated career structure for teachers and a promotions system based on merit, as described above, would help attract more prospective teachers of high quality. This is especially important in the curriculum areas of greatest shortage because mathematics and science graduates have lucrative career prospects in other professions. However, teacher supply is also constrained by the limited ways in which prospective teachers can qualify to be registered.

A gulf is emerging between boys and girls in educational outcomes (see Introduction). Girls are achieving more highly across the curriculum, especially in literacy. For example, a recent trial of literacy standards for NCEA showed that the standards for reading and writing were attained by 61% and 27% of male participants respectively, compared with 67% and 42% of female participants.[56] An analysis of the 2021 NCEA achievement standard results, conducted for this report, showed that girls had higher pass rates in every major subject, in both internal and external assessment, at all three NCEA levels, except external assessment for Level 2 economics, which was at parity.

At Manurewa Intermediate, boys achieve as highly in literacy as girls. Half of the school's teachers are men, compared with just 18% at primary schools nationwide. Principal Iain Taylor believes that boys respond well to high expectations and consistent routines, with strong discipline. With the right leadership and pedagogical approach, the ongoing underperformance of our education system for male students could be turned around.

The reasons we are failing our male students are not well understood, but one element may well be a lack of male teachers. Ministry of Education data show that in 2021, just 15% of primary teachers and 36% of secondary teachers were male. Male teachers can provide positive role models for male students.[57] In particular, they demonstrate that education is a masculine as well as a feminine domain. More male teachers would also balance out the gendered culture of schools. Male teachers, therefore, ought to be actively recruited and offered incentives that are likely to attract them.

Morris and Patterson argued that New Zealand needs to open more pathways into teaching.[58] One recommendation was to entice mid-to-late-career professionals into teaching without their having to take time out of paid work to train. Prospective teachers could be employed directly by schools and trained on the job, with oversight from an accredited provider of pre-service training. This would cover the theoretical aspects of ITE.

Since Morris and Patterson's report was published, some limited pathways into teaching other than graduate programmes have opened.

In particular, Ako Mātātupu (Teach First NZ)[59] allows graduates to work as beginning teachers in low decile schools while they complete a Postgraduate Diploma in Secondary Teaching. Scholarships cover study fees.

The Ako Mātātupu approach does not go as far as Morrison and Patterson suggested and is unlikely to be enough to address the teacher shortage. A critical difference is that schools are not driving the process as Morrison and Patterson suggested. Furthermore, Ako Mātātupu focuses heavily on 'indigenising' education, with a strong māturanga Māori lens. That approach is likely to limit the field of applicants to those interested in māturanga Māori. Epistemologically, it will not result in the strong disciplinary focus required to improve the quality of science and mathematics education.

Another potential source is overseas-trained teachers. At present, teachers registered to practise in Australia can apply for New Zealand registration as per the *Trans-Tasman Mutual Recognition Act*. Some teaching qualifications from the United Kingdom, Canada, South Africa and Fiji are pre-approved for recognition. Prospective teachers from elsewhere have to apply to NZQA to have their qualifications recognised and also show that they meet the conditions for teacher registration in New Zealand.

Instead of confronting international teachers with complex bureaucratic hurdles, we could empower state schools to employ international teachers, subject to meeting English language requirements if they are from a non-English speaking country. Those schools could be funded and made responsible for correcting any discrepancy between those teachers' experience and meeting the criteria for teacher registration in New Zealand.

Finally, a one-line budget to school principals and boards would give more flexibility in allocating their financial resources and hiring suitable staff. Schools would then have the funds to pay a premium for teachers in their high-priority areas, and retain excellent teachers. One caveat is that the funding allocated for each student should follow them when they change schools. At present, only operational funding is allocated on a per student basis. A truly one-line budget would include the capital component of school funding as well. That would afford schools much more flexibility in the way they allocate their financial resources.

These suggestions come with a caveat. If schools more autonomy in hiring and paying staff, they must also be accountable for the consequences of their decisions. Chapter 4 describes a set of mechanisms that can deliver this accountability.

If Principals, as the executive leaders of schools, are to be accountable for educational results, and for allocating a one-line budget, they must also be allowed to manage their staff and budgets. There is then a need for a systematic approach to training principals. New principals typically have little experience in managing a large staff – although many will have been middle managers in schools – and almost no experience in financial management. The Ministry of Education provides online resources[60] for new principals, but there is no expectation or provision of more explicit training.

## Proposals

1. Schools should be able to hire professionals with knowledge in critical areas without a teaching qualification. Where schools are fully accountable to their parents and communities, teacher performance, rather than their qualifications, should be the decisive factor. Even so, schools may wish to support teachers recruited in this manner to work towards an accredited qualification. If more convenient for teachers-in-training, study could be completed online in partnership with an accredited provider. Alternatively, a new provider could be established to provide online support for this mode of teacher recruitment.

2. There should be a concerted focus on encouraging more men to take up teaching.

3. Schools should be able to hire international teachers with key expertise without bureaucratic oversight. Immigration processes for these teachers should be expedited and rely only on good character checks. In the case of teachers from non-English speaking countries, certification evincing sufficient proficiency in English to teach in New Zealand should also be required. Again, schools would be responsible for ensuring that these teachers meet the requirements for registration in New Zealand within a reasonable timeframe.

4. Schools should receive a one-line budget, enabling them to pay a premium to staff in curriculum areas that are difficult to recruit in, or who are otherwise particularly valued. Per student funding should include both the operational and capital components of Vote Education and follow students who change schools.

5. New principals should receive mandatory, publicly funded courses focusing on management and financial competence.

CHAPTER 7

# Systems monitoring and reporting to parents

Education in New Zealand at a systems level is not well monitored. Neither is there any reliable or consistent information available to parents on school performance. While ERO publishes periodic reports on every school, these not typically focussed on, nor much informed by, objective evidence of student achievement. Some schools publish the results of standardised tests, and secondary schools may release their NCEA results. However, these data are not adjusted for socio-economic variation between schools. Unadjusted data make schools serving wealthier communities appear better than they are, and schools serving communities with high levels of deprivation appear poorer than they are. In any event, there is no mandatory reporting or publishing of data reflecting school performance.

While NCEA produces a great deal of data for Years 11–13, NCEA programmes differ markedly in the knowledge domains assessed and in the level of challenge. So, NCEA pass rates, while better than nothing, are not a rigorous index of school quality. For example, while NCEA pass rates have risen over the past decade, New Zealand's results in international assessments have continued to decline. University Entrance (UE) provides a more reliable measure because it uses a circumscribed set of achievement standards, drawn mostly from disciplinary subjects. These subjects tend to have greater academic consistency than many others. Even so, just half of Year 13 students attain UE, and for many it is not a goal. UE attainment rates do not, therefore, constitute valid measures of school quality either.

The National Monitoring Study of Student Achievement (NMSSA) provides high-quality data on a representative sample of schools. However, its resource constraints allow it to monitor only Years 4 and 8, rotating through curriculum areas over time. It is not funded sufficiently to monitor every area, every year, or any other year level. NMSSA is resource intensive; it requires trained assessors to conduct diagnostic interviews with individual children. Teachers do not have the time, expertise or resources to carry it out themselves. As such, it is not a feasible solution to obtaining school-level data on student achievement.

The Key government attempted, unsuccessfully, to provide systems monitoring and information to parents through National Standards for Years 1–8 in reading, writing and mathematics. This failure of National Standards was, in part, attributable to the unreliability of its assessment processes; teachers were expected to estimate children's attainment without any assessment tools designed for the purpose. The result was highly inconsistent and unreliable data both across the country and over time.

The central issue with National Standards, however, was not its poor psychometrics, but trenchant political opposition. While some teachers supported the system, a substantial majority did not. National Standards were opposed by the primary teachers' union – the New Zealand Education Institute (NZEI); the New Zealand Principals Federation (NZPF); and the Labour opposition. When the Ministry developed a valid and reliable assessment system

– the Progress and Consistency Tool (PaCT) – to address the reliability problems with National Standards, NZPF recommended that Principals and Boards "have no … engagement with PaCT's development, including running trials of PaCT …, contributing to rubric evaluation, or engaging with it in any way."[61] One of the first acts of the Ardern government was to abolish National Standards.

A different approach with the following three elements may help to avoid the political problems that dogged National Standards:

1. resource NMSSA better to establish national norms in key curriculum areas;
2. produce assessment resources aligned with NMSSA for use by teachers; and
3. create a mechanism for schools to publish their results, adjusted for socio-economic factors.

The first element is relatively straightforward. NMSSA should be resourced and mandated to monitor from Years 1 to Year 10 in reading, writing, mathematics and, from Years 4 to Year 10 in science.

At Manurewa Intermediate, there is an effective system for monitoring students' progress and the schools' performance. They systematically use standardised tests at the beginning and end of each year. This gives teachers information to inform reflection on their practice, and the school information to give it confidence that it is performing well. Principal Iain Taylor was a supporter of the system of national standards that ran during the years of the Key government. He believes that they made teachers much better at assessment and professional reflection. He did not, however, agree with the public reporting, or the way the standards were developed. In fact, he does not believe they were really standards at all.

The second element entails producing a new assessment resource, aligned with NMSSA measures and suitable for teachers to use in schools. A range of assessment approaches can be considered, from the guided judgement approach of PaCT to the multiple-choice format used by Progressive Achievement Tests (PATs). Alternatively, if existing tools such as PaCT or PAT are shown to sufficiently align with the NMSSA scale, using these in lieu of developing new assessments would be more cost-effective.

Comparative judgement software could be used to assess writing. When an assessment is to be used for monitoring, and feedback to students is not required, comparative judgement is a reliable and time-efficient approach. Whatever assessment is used must be underpinned by a measurement scale that is highly correlated with the NMSSA scale. This would enable a meaningful comparison of results at the school level with NMSSA norms.

Separate to the curriculum monitoring described above, some more specific knowledge and skills should be measured in the first two years of school. Specifically, in the first year, assessments of sensory and cognitive functioning and of baseline knowledge should be adopted to identify children at risk of not progressing in a typical fashion. In Year 2, a phonics check such as that used in South Australia[62] should be used to ensure a focus on the effective development of literacy.

The third element entails establishing a statistical model to adjust the national norm based on socio-economic variables. This model can be built using the very same socio-economic variables used to calculate the funding for each student under the equity index. As well as being the most comprehensive statistical model possible, it has the advantage of having been extensively trialled.

The statistical model itself would predict the average progress of each student in a given year, on the basis of his or her socio-economic data.

Expected progress is calculated simply by comparing the scale location expected in the previous year with the location expected in the current year. Actual progress is similarly calculated by comparing the scale location attained in the previous and present years. Measures of both progress and of absolute achievement are required. Progress measures are needed because many students are transient, and schools should be accountable for what they have contributed to a students' attainment rather than what they have or have not learned at another school. Even for students staying at the same school, the focus for accountability should be on present improvement as well as absolute attainment.

Each student's actual progress and attainment would be compared with his or her predicted progress and attainment, to provide a discrepancy score, either above or below the expected norm. Discrepancy scores would then be aggregated within each curriculum area and year level. Another relevant indicator would be comparisons of students' progress against curriculum expectations, expressed on the same scales as the school assessments and likewise adjusted for socio-economic factors.

Aggregated scores should be published on the Ministry website, along with attendance data and supplementary information, provided by schools, regarding any special character they have (e.g. Catholic, Montessori), or anything else they deem relevant to prospective parents. This repository of information would then be available to guide parents in choosing a school.

An additional benefit of an expanded NMSSA would be much more comprehensive national monitoring than we presently have. In that regard, while NMSSA data in selected curriculum areas (reading, writing, mathematics and science) would be sufficient to provide information about schools to parents, complete curriculum coverage would be desirable for national monitoring.

## Proposals

1. NMSSA should be resourced to undertake a reliable sample study of achievement in reading, writing and mathematics every year, at every year level from Year 1 to Year 10. From Year 4 on, a sample should be selected for science as well. Other curriculum areas could continue to be monitored on a rolling basis at Years 4 and 8.

2. New assessment tools should be produced for reading, writing, mathematics and science, suitable for teachers to use to assess their students without the training required to undertake NMSSA assessments. Alternatively, existing tools could be used if they show sufficient alignment with NMSSA. The measurement scales for these assessments must be well correlated and aligned with the NMSAA scales. Standard setting should be undertaken to calibrate the scale for each assessment with its NMSSA counterpart.

   The Ministry should support schools with statistical analysis, comparing progress made annually in each curriculum area by each year level with estimated NMSSA norms.

3. A statistical model should be developed to estimate the average progress expected in a year in each of the NMSSA curriculum areas, with adjustments to the estimates based on all of the socio-economic variables used to calculate equity index funding. The model would estimate progress norms and curriculum achievement expectations for individual schools.

4. A parent portal should be made available on the Ministry website. Schools could use the portal to inform parents, displaying comparisons of attainment and progress of students at each school with the socio-economically adjusted normative and curriculum progress expectations estimated by the model described in (3) above. These portals could also be used to publish other information for parents considered relevant by each school. This would provide parents with high-quality information to guide them in choosing schools for their children.

## CHAPTER 8

# The New Zealand Council for Education Research

The New Zealand Council for Education Research (NZCER) operates under legislation, currently the *New Zealand Council for Educational Research Act 1972*.[63] It performs a range of functions, including conducting research on the education system, publishing books and journals, producing educational assessments, and providing a psychological test service. NZCER is also involved in designing and running the National Monitoring Study of Student Achievement (NMSSA).

NZCER produces assessments of very high quality. The Progressive Achievement Tests in particular are widely used in New Zealand schools. They are underpinned by sound psychometrics and are as valid and reliable as can be expected for assessments of their kind. NZCER psychometricians were also involved in producing the Tertiary Education Commission's Literacy and Numeracy Assessment Tool for Adults[64] and the Progress and Consistency Tool (PaCT).[65] These tools reflect the state-of-the-art in assessment design. The TEC literacy tool uses a computer-adaptive approach, with a measurement model calibrating question difficulty on the fly. This affords time-efficient and reliable measurement. PaCT calibrates teachers' judgements to a measurement scale without requiring children to sit tests at all. This is ideal for assessing children too young to undertake testing.

The high quality of NZCER's assessment tools is largely due to the commensurately high quality of its psychometricians. This is a little-known and valuable pocket of expertise in New Zealand's education system. It should be fostered and resourced to expand – there is much more it could be doing. In particular, it could preside over a much larger NMSSA, as proposed above (see "Systems monitoring and provision of information to parents").

At present, little of NZCER's research on the education system is focused on systematic, quantitative studies. Instead, most of its research is qualitative, small-scale and not generalisable. As such, it is of limited value for systems improvement purposes.

In *No Evidence, No Evaluation, No Exit,* Michael Johnston criticised the Ministry of Education for its Modern Learning Environments strategy (2011).[66] Billions of dollars were spent on replacing New Zealand's classrooms with large, open-plan environments.

Johnston's main criticism was that the project was implemented without either a sound research base or an evaluation plan. More than 10 years after the project was initiated, there is still no reliable evidence available on the effects of these environments on students' learning. He recommended that all future educational initiatives of any scale should be based on reliable, generalisable research and implemented alongside a plan to rigorously evaluate them. The NZCER is an obvious agency to conduct such research and evaluation.

Other pressing topics that require rigorous research include educational inequality between demographic groups. For example, although the Ministry has taken the position that Māori and Pacifica students suffer from systemic racism

in education, an equally plausible explanation for differences in achievement between ethnic groups is the socio-economic disadvantage of some relative to others. This question could be unpacked using Statistics New Zealand's integrated database. The educational underperformance of boys relative to girls is another phenomenon needing urgent research attention.

### Proposal

NZCER should be reviewed and partially repurposed. Its publication function should continue as is. Its psychometric and assessment work should be expanded and resourced to carry out an augmented NMSSA. The core research function of NZCER should be refocused on large-scale quantitative, generalisable research on teaching and learning. It would employ intervention studies and other methods to elucidate the most effective methods of teaching. This would include piloting all Ministry teaching and learning initiatives and evaluating them post-implementation. Some qualitative research should still have a place, especially in conjunction with larger-scale quantitative studies. The research should be published in reports, give best-practice advice based on that research, and be made available to all teachers.

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