The quest for scale: Achieving system-wide innovation and improvement in education

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Contents

Executive Summary

The quest to achieve innovation and improvement at scale can be considered the holy grail of education reform, with governments and increasingly donor-funded initiatives, aspiring to achieve sustained, systemic innovation and improvement that reaches every student, in every classroom, in every school in New Zealand. Yet, despite the best of intentions, and a myriad of reform efforts over the past twenty years, encompassing system-wide school improvement strategies and structural reforms as well as smaller-scale initiatives targeting a particular aspect or group within education, there has been little demonstrable improvement in the enduring challenges facing our education system.

Conceptualising scale in education

Traditional definitions of scale tend to focus primarily on expanding numbers. However, there is growing recognition that conceptualising scale (and by extension the success of an initiative) purely quantitatively fails to capture the often significant variation in implementation and impact of an initiative across different contexts and populations, and whether an initiative effects meaningful and enduring change. It is increasingly common to conceptualise scale in education as encompassing four interrelated dimensions:

- **Spread:** maintaining impact across diverse settings and populations
- **Depth:** effecting deep change to the instructional core
- **Sustainability:** impact is maintained long term
- **Shift in ownership:** each local community is empowered to own and drive forward the change efforts

As well as encompassing the four dimensions, it generally is recognised that successful scaling involves change across three levels. First, educational improvement change or systems reform must occur at the governmental, policy or system level. Second, organisational change must occur at the school or institutional level. Third, individual change must occur at the teacher or school leader level, the frontline workers who generally are responsible for implementing educational reforms on the ground. While a reform or new initiative may originate at any level, successful scaling generally (but not always) requires buy-in and change across all three levels.

Most accounts of successful scaling in education involve the implementation of a specially designed product or programme, which addresses a discrete problem or area of education. The product approach to scale typically emphasises fidelity of implementation across contexts for success. However, it increasingly is argued that such an approach to reform and improvement subverts the complexity and context-rich nature of education, and in doing so risks reducing teaching to a transactional model, which is based on the administration of a series of decontextualised treatments or discrete programmes. In contrast, the process approach to scaling instead focuses on fidelity of process. Its fundamental precept is that achieving lasting system-wide change and innovation in complex education systems will not come from continually adding new inputs or products but rather requires building within-the-system capability to collaboratively construct new interactions and knowledge.

Rethinking scale: a new paradigm for innovation and improvement

The scarcity of successful examples of system-wide scaling in education and the corresponding paucity of defining narratives or research on how to scale up success in education has contributed to a growing number of critics challenging the notion of scaling in education both in principle and practice. These critics argue that we should be less concerned with identifying the right innovation to implement at scale or determining how best to adapt it to individual contexts, and more concerned with changing the culture of schooling. Fundamental to this work are two components: (1) the robust deployment of continuous improvement methods to promote iterative innovation, and sustained learning and progress; (2) and a systemic approach to collaboration through the creation of powerful and well-designed networks.

While the exact way in which a networked improvement approach is implemented in a given context may vary, the literature suggests that to be successful, it must adhere to the follow 6 components: (1) Building capacity and accelerating the ability to learn; (2) Implementing rigorous learning cycles to develop practice-based evidence; (3) Using data to reinforce and inform iterative improvement; (4) Purposeful collaboration among diverse stakeholders; (5) Highly structured processes and ways of working; and (6) Central hub support to initiate and integrate activity across the network.

Communities of Learning | Kāhui Ako: A vehicle for sustained, networked improvement?

Communities of Learning | Kāhui Ako (hereafter 'CoL') were introduced in 2014 as part of the Government's Investing in *Educational Success [IES] programme*. The IES initiative conceives of CoL as mechanisms for raising achievement through collaboration and capacity building, particularly through the sharing of expertise. The design rests heavily on members' engagement in inquiry, particularly collaborative inquiry, and use of evidence and data. At least on the surface, CoL appear to share much with a networked approach to innovation and improvement. However, while the formation of CoL may be an important step in the process of scaling educational improvement in New Zealand and fostering inter-school collaboration, their current design and implementation reduces their ability to effective deep and sustained change.

There is growing evidence to suggest that in many instances CoL are failing to achieve collaborative processes or to effect the level of innovation or improvement that was anticipated. Recent reports on the establishment of CoL have identified deep issues affecting their ability to produce desired outcomes/outputs. Comparing the design of CoL with the six components of a networked improvement approach identifies some key areas of tension:

- While a stated aim of CoL, capacity building and developing educators' mindsets appear to be positioned as by-products of participation and engagement rather than features specifically built into the model
- The nature, quantity, quality and timeliness of the data collected by schools and communities, and the effectiveness of data analysis, interpretation and application processes, are variable.
- Educators are the primary participants in CoL, with expert partners positioned as external advisors rather than as integral and equal members of the collaborative partnership.
- There has been limited support, resourcing and technology provided to CoL to facilitate effective communication and knowledge management or to support interaction, collaboration or knowledge sharing between CoL.

Conclusions: Where to from here?

To achieve system-wide innovation and improvement the focus in education must shift from implementation to learning. A learning system moves away from a top-down policy driven approach to reform, and instead emphasises the need to build capacity within the sector to learn and develop continuously. This requires a policy environment that invests seriously in the cultural and institutional infrastructures of professional practice.

Such a paradigm of innovation and improvement combines both a deep appreciation for the research evidence to inform new approaches and new learning, whilst simultaneously rejecting a focus on universal prescriptions. It appreciates and champions the need to adjust powerful ideas to diverse contexts and diverse populations, holding a deep recognition and appreciation for pluralism in education. To achieve this, the system must empower educators to work in collaboration with each other, and with researchers, designers, and other experts to create the conditions, systems, and infrastructure needed to ensure our young people can thrive. These ideas are not completely new to the New Zealand education system. However, they are not currently embedded in ways that consistently drive mindsets, actions and behaviours in education.

Introduction

With the government conducting a 3-year work programme to comprehensively review education in New Zealand, it seems timely to consider the evidence on how to achieve system-wide reform in education. The work programme comes on the back of a myriad of reform efforts over the past 20 years, encompassing system-wide school improvement strategies and structural reforms as well as smaller-scale initiatives targeting a particular aspect or group within education.

Yet, despite the best of intentions, there has been little demonstrable improvement in the enduring challenges facing our education system. The system continues to grapple with 1) inequality of opportunities and outcomes and one of the largest performance gaps between the top 10 per cent and bottom 10 per cent of students among OECD countries;[1] 2) wide variability both between and within schools, amounting to roughly a 3-year learning gap between the top and lowest performing schools;[2] 3) a growing teacher shortage;[3] 4) falling reading achievement;[4] and 5) questions over the preparedness of young people to become active and successful members of society and the economy.[5]

The lack of progress in addressing these challenges stems not from a lack of ideas or from want of trying. The quest to achieve innovation and improvement at scale can be considered the holy grail of education reform, with governments and increasingly donor-funded initiatives aspiring to achieve sustained, systemic innovation and improvement that reaches every student, in every classroom, in every school in New Zealand.

While successful programmes and practices are dotted across the education landscape, maintaining their original impact and outcomes with the passage of time remains elusive. Similarly, one can point to numerous examples of successful improvement efforts in individual schools. This improvement, however, does not routinely spread across multiple schools, nor are the outcomes always sustained. Too often promising initiatives and approaches fail to become widely available or to be successfully embedded at scale.

The quest for scale, while seemingly self-evident in its intent and desirability, remains a contested and frequently misunderstood pursuit in education. There is limited consensus about what is actually meant by ‘scale’, the types of interventions and ideas that should be scaled, and ultimately whether scale is a desirable intention or outcome in education. Indeed, a growing number of scholars advocate a rethinking of scale in education, arguing that ‘going to scale’ rarely delivers the desired outcomes or systems change. Instead they argue for a new paradigm of improvement and innovation in education that focuses on changing the culture of schools and education, and building local ownership of the learning agenda.

This report explores this quest for improvement and innovation at scale. Part I provides a critical review of the literature on scale and scaling in education. Part II presents an alternative paradigm for achieving improvement at scale in education – a networked improvement approach. Part III explores whether current structures and policies in New Zealand, particularly Communities of Learning | Kāhui Ako, could facilitate a networked improvement approach to spur sustained, systemic improvement and innovation.

Part I: Grappling with the concept of scale

Conceptualising scale in education

Traditional definitions of scale tend to focus primarily on expanding numbers. That is, getting an intervention into more schools, typically as quickly as possible. There is growing recognition that conceptualising scale (and by extension the success of an initiative) purely quantitatively fails to capture the often significant variation in implementation and impact of an initiative across different contexts and populations, and whether an initiative effects meaningful and enduring change. It is increasingly common to conceptualise scale in education as encompassing four interrelated dimensions: spread, depth, sustainability, and shift in ownership.[6] For an intervention to be considered successfully scaled, it must fulfil the conditions of each of the four dimensions, which are as follows:

- **Spread:** maintaining impact across diverse settings and populations
- **Depth**: effecting deep change to the instructional core
- **Sustainability:** impact is maintained long term
- **Shift in ownership:** each local community is empowered to own and drive forward the change efforts

Spread extends beyond numbers to suggest an initiative must maintain its impact across diverse contexts and populations. Traditionally, spread has primarily focused on achieving fidelity of implementation across contexts – a notoriously tricky feat to achieve in education. The difficulty in part reflects the context-rich nature of education, where educators create knowledge and teaching strategies that are relevant to the unique settings of their individual schools and cater to the backgrounds, interests, needs and prior knowledge of their students. In short, what works in one context or setting and with one set of actors or participants will not always readily transfer to another context or set of actors. Consequently, in some quarters there has been a move away from fidelity of implementation towards fidelity of process. That is, ensuring continuity in the processes and structures that facilitate and underpin a change across settings while enabling some degree of variability in how an initiative is implemented and embedded in different contexts.

Depth emphasises the nature and quality of the reform being implemented and, more specifically, its ability to effect deep and consequential change in classroom practice, what has been described as the instructional core.[7]

Instructional core

The instructional core focuses school improvement efforts on the interactions between teacher, students and content in the classroom. It does not discount the importance of organisational conditions for improvement but rather suggests that without addressing the actual experiences of children at the classroom level it is impossible to achieve meaningful and sustained change in student outcomes (however they may be conceived).

To improve student learning at scale it is necessary to:

- Raise the level of content that students are taught
- Increase the teachers' skill and knowledge that they bring to the teaching of that content
- Increase the level of students' active learning (engagement) of the content

City, E., Elmore, R., Fiarman, S., & Teitel, L. (2009). *Instructional rounds in education: A network approach to teaching and learning*. Cambridge, MA:

Effective scaling must go beyond surface-level or procedural change and change in organisational structures to effect change in teachers' beliefs and behaviours in order to influence the fabric of teaching and learning. Richard Elmore explains the complexity of achieving depth:

> The knowledge of what to do has to reside not in the mind of some distant policy wonk or academic, but in the deep muscle-memory of the actual doer. When we are asking teachers and school leaders to do things they don't (yet) know how to do, we are not asking them to ''implement'' something, we are asking them to learn, think, and form their identities in different ways.[8]

Effective scaling efforts, therefore, must include capacity-building efforts that support teachers to know how to engage with and interrogate new knowledge and practices, how to assimilate and interpret these in their individual contexts, and how to navigate new knowledge and practices that may not fit with their current working theories and beliefs.

Sustainability requires that initiatives and the changes and outcomes they produce must be sustained long term. While the nature of the initiative and the outcomes it produces may vary over time, to achieve scale means to effect lasting and embedded change. Sustainability – maintaining impact over time – remains one of the most challenging aspects of scale in education, with schools and individuals often struggling to sustain initiatives in the face of new demands and policy initiatives, staff turnover and competing priorities.

Lying beneath and ultimately informing the long-term success of any changes to the instructional core is a **shift in ownership**. Moving from an externally mandated to a locally owned initiative requires substantial capacity building so that local actors are able to sustain and drive forward the initiative, embedding and sharing it within their own context. It is this shift in ownership that ultimately will enable the sustainability of the initiative, ensuring that the changes in mindset and behaviour it has inspired remain, even in the face of changes in policy, personnel, funding or other support.

Change across three levels

It generally is recognised that successful scaling involves change across three levels. First, educational improvement change or systems reform must occur at the governmental, policy or system level. Second, organisational change must occur at the school or institutional level. Third, individual change must occur at the teacher or school leader level. While a reform or new initiative may originate at any level, successful scaling generally (but not always) requires buy-in and change across all three levels.

System-level activity is most closely associated with policy initiatives and top-down reform efforts. However, evidence from both research and practice suggests that initiatives developed in individual schools or across groups of schools have greater potential to scale and succeed if they receive consistent and long-term policy support. The changeable nature of the policy context together with the 3-yearly election cycle in New Zealand leaves policy-driven reform and innovation vulnerable to changes of government and shifts in local and national leadership.

In education, the majority of reform efforts are mediated by organisations, most commonly schools. In the devolved schooling context of New Zealand, where each school is independently responsible for implementing change initiatives, the ability to effectively structure and manage organisational change is critically important. A school's culture and structures are critical to empowering and sustaining individual change at the level of teachers and school leaders.

While the particular initiative or change often is developed (and potentially mandated) externally and is mediated through individual teachers' organisational contexts, it is at the individual level that meaningful and lasting change in the instructional core is effected. That is, without change at the individual teacher level, reform and innovation generally will not succeed. An individual teacher's environment, including the presence of support structures and opportunities to make changes and receive feedback and coaching, are central to effecting changes in a teacher's thinking, beliefs and practice. Inquiry-based approaches can help to sustain individual change through the repeated iterations of learning, implementation and evaluation. However, inquiry without proper external support to introduce new ideas and new ways of thinking and working will never bring about the level of change and innovation desired in education systems.

Product approach versus process approach to scaling

Product approach

Most accounts of successful scaling in education discuss a specific programme or intervention. Programmes such as Reading Recovery or the River City Curriculum (a technology-based curriculum) involve the implementation of a specially designed product. They rely on fidelity of implementation for success while permitting the incorporation of minor amendments proposed by users. Such products primarily address a discrete problem or area of education, for example early literacy development. However, they may also include programmatic approaches that address multiple areas.

There undoubtedly is a need for programmatic approaches to foster improvement in teaching and learning. And particular aspects of education lend themselves to such an approach. However, individual products or even a series of programmes cannot fully address the enduring challenges facing our education system. This approach runs the risk of reducing teaching to a transactional model that is based on the administration of a series of decontextualised treatments or discrete programmes. In doing so, it fails to adequately recognise the multifactorial, context-rich nature of teaching (and the learning it inspires). Teaching is embedded within nested systems – encompassing the teacher, the classroom, the school, the student, the family, the community and the broader policy context – that come together in continuously changing formations to form a complex system of interactions and relationships.

Too often, programmatic approaches, in their quest to reach large numbers in a relatively short time frame, subvert the complexity of education and instead focus on uniformity and maintaining implementation fidelity. Increasingly it is recognised that the success of individual, discrete programmes or products in education is reliant on the processes that surround their implementation and embedding in individual contexts. That is, a programme must be conceptualised and positioned within the broader framework and ecosystem of processes, initiatives and culture that operate within a school context, rather than being positioned as an isolated unit.

The process approach

In contrast to the product approach, the process approach to scaling moves away from the view that large-scale change within traditional systems requires fidelity to standardised approaches and procedures and instead focuses on fidelity of process. In this approach, the process of knowing how to improve and the conditions, including the learning required, that enable improvement to occur across contexts are the core focus. Its fundamental precept is that achieving lasting system-wide change and innovation in complex education systems will not come from continually adding new inputs or products. It instead requires building within-the-system capability to collaboratively construct new interactions and knowledge.

There are few examples of sustained process-level scaling in education. This may reflect the absence of well-established models of implementation science in education and the limited capacity of people within the system to manage long-term change projects. Ontario's public education system and the Long Beach United School District in California, however, provide two frequently cited case studies of successful process approaches to scaling.[9] Both are characterised not by a particular product or programme but by a comprehensive process of systemic improvement involving ongoing cycles of learning

and iteration, initiated and supported by the highest levels of district leadership. The success of these improvement journeys was not reliant on the spread of particular activity structures, materials or classroom organisations, although there were particular products or programmes that were implemented within the broader reform efforts. Instead they focused on what happens below the surface to address beliefs, norms, pedagogical principles and the culture of schooling.[10] In both cases, using this approach effected deep change both at the micro level of particular practices in individual classrooms and schools and at the macro level of deep systemic processes and ways of working.

While Ontario and Long Beach both have achieved relative levels of success with their process approach to reform, too frequently process-approach efforts suffer from the absence of rigorously applied implementation strategies to support the uptake of new ways of thinking and methods of working. A recent report from the Centre for Evidence and Implementation found that education, and particularly education in Australia and New Zealand, suffers from the underdevelopment of implementation concepts and models to inform a stronger and more systematic planning of the design and initial implementation of a new approach or the development of systems within and across schools to support continuous quality improvement.[11]

Part II: Towards a new paradigm for innovation and improvement

"Scale" for its own sake is less important than demonstrating that powerful ideas can work in diverse environments and creating powerful networks that are capable of operating with or without the cover of public authority. (Elmore, 2016)

The scarcity of successful examples of system-wide scaling in education and the corresponding paucity of defining narratives or research on how to scale up success in education has contributed to a growing number of critics challenging the notion of scaling in education in both principle and practice. Michael Fullan asserts: 'I … want to dismiss going to scale as an approach. I don't know of any evidence that demonstrates that going to scale is viable as a model for system change in education.'[12] Tony Bryk, director of the Carnegie Foundation for the Advancement of Teaching, similarly observes that 'the press to push good ideas into rapid large-scale use rarely delivers on the outcomes promised'.[13]

Critics challenge scaling on the grounds that it is antithetical to contemporary theories about teaching and learning. Elmore, for instance, states that 'there seems to be endless optimism … that somehow we can make things better by "implementing" something called "best practices" "at scale",' which demonstrates 'an irresponsibly simplistic and schematic view of human learning and development'.[14] These critics argue that we should be less concerned with identifying the right innovation to implement at scale or determining how best to adapt it to individual contexts, and more concerned with changing the culture of schooling – something more akin to the process approach to scaling.

For Elmore, this requires 'think[ing] about "scale" and "spread" in terms of the development of theories and practices of learning through human interaction and the creation of culture, rather than adapting ideas and evidence to the "realities" of existing institutional cultures'.[15] This suggests moving away from a solution-oriented view of scaling and improvement towards a problem-centred approach that is focused on understanding the needs of the local context and building the capacity of local actors to implement sustained change programmes. Fullan similarly insists that success depends on 'changing the culture of schools and their relationship to the infrastructure of policies and regulation'.[16] He further argues that the solution for system improvement consists of three key elements of deep change: 1) a culture of learning; 2) local ownership of the learning agenda; and 3) a system of continuous improvement and innovation that is simultaneously top-down, bottom-up and sideways.

These challenges to traditional notions of scaling do not suggest that system-wide innovation and improvement is undesirable or even (potentially) unattainable. Rather they argue that traditional approaches to how and what to scale need to be reconceptualised. That is, a new paradigm for innovation and improvement is needed in education: one that prioritises learning and builds a system's ability to improve through culture change and capacity building at all levels. Fundamental to this work are two components: 1) the robust deployment of continuous improvement methods to promote iterative innovation and sustained learning and progress; and 2) a systemic approach to collaboration through the creation of powerful and well-designed networks.

A networked improvement approach

Proponents of continuous improvement methods argue that they address the currently uncoordinated infrastructure for learning to improve in education and the 'absence of a robust knowledge base for addressing problems of practice'.[17] Continuous improvement methods differ from traditional scaling interventions or research-driven interventions in two key ways. First, they are problem centred rather than solution driven. There is a tendency in education towards 'solutionitis' – identifying the next solution to an often unspecified problem. Continuous improvement methods instead begin from developing a deep understanding of the current context and circumstances in order to devise new approaches, innovations and ways of working that are matched to specific needs and opportunities. Secondly, improvement methods are focused on accelerating the field's capacity to learn and improve, recognising that building the capacity of practitioners and creating a culture and process for change are essential to the long-term, sustained success of any new initiative. [For examples of improvement methodologies, see Two approaches to continuous improvement]

Two approaches to continuous improvement

Improvement science

Improvement science emerged in healthcare as a research framework to determine which strategies and approaches work most effectively. More recently, improvement science has been used in education. It deploys rapid tests or cycles of change to guide the design, iterative development and continual improvement of new tools, processes and relationships. The overall goal is to develop the necessary know-how for a reform idea ultimately to spread faster and more effectively.

Improvement science employs quick cycles of Plan, Do, Study, Act (PDSA) to enable fast learning (and failing) and drive quick improvement. Each PDSA cycle is a mini experiment driven by three questions:

1. What specifically are we trying to accomplish?
2. What change(s) might we introduce and why?
3. How will we know that a change is actually an improvement?

Design thinking

Design thinking is a methodology commonly employed in agile organisations that combines a structured approach to innovation with a human-centred design ethos. In other words, it puts the needs of the customer front and centre. While design thinking typically is organised into a series of stages, it is important to recognise that it is a non-linear, iterative process. Stages might occur concurrently, or the insights and learning generated during a stage may further deepen the thinking at an earlier stage. The stages are:

- **Empathise:** gaining an empathetic understanding of the problem you are trying to solve by engaging with key stakeholders in the local contexts as well as with experts
- **Define:** drawing on the evidence collected during the previous stage to define the key problem that you are wanting to solve
- **Ideate:** generating different ideas and ways to address the problem
- **Prototype:** developing an initial version of the product or approach to address your problem
- **Test:** implementing the prototype in practice and evaluating the outcomes and impact

The integration of new improvement methods within a networked approach is designed to increase the breadth and depth of learning and impact. The potential of networks for enhancing teacher learning and encouraging teachers to take an active role in the creation, dissemination and reconstruction of knowledge has been long established. However, in the context of a new improvement paradigm, networks arguably take on a more specific function, enabling more formalised collaboration and collective learning through the implementation of highly structured processes and ways of working.

Networks enable people with a diverse range of knowledge and expertise to contribute to the creation of new ideas, as well as facilitating the more fluid exchange of these innovations, and the insights that emerge from them, across contexts and traditional institutional boundaries. They enable different participants within the network to work on and test different approaches and to share their data and learning to enable all participants to learn from each other. This distributed approach to problem solving and learning accelerates the breadth and depth of learning that can be achieved, therefore enhancing the capacity and rate of innovation and improvement.

The power of carefully coordinated networks is described by Slavin and Madden, designers of the US-based Success for All programme, who claim that 'building a national network of Success for All schools is one of the most important things we are trying to do'. They recognise that 'systemic and lasting change is far more likely when schools work together as part of a network in which school staff share a common vision and a common language, share ideas and technical assistance, and create an emotional connection and support system'.[18]

Comparing teaching as inquiry with improvement research

The concept of inquiry is familiar to most educators in New Zealand schools, with many schools engaging in teaching as inquiry. Like improvement research, teaching as inquiry seeks to promote on-the-ground learning and the generation of knowledge of and from practice to inform discussion and collaboration. What differentiates the learning cycles used in improvement research from the teaching as inquiry process are the tighter structures and processes that guide their operation. Learning cycles are characterised by rigorous methods, engagement with those outside the immediate school context, explicit frameworks and time frames for engagement (such as Carnegie's 90-day cycle) and clearly defined roles for different stakeholders involved in the learning. Without the rigour that characterises improvement research, inquiry cycles too often do not lead to effective problem identification, appropriate interventions, and ongoing systemic learning and capacity-building, which minimises the impact they have on improving student outcomes.

The six essential components for embedding a networked-improvement paradigm in practice

While the exact way in which a networked improvement approach is implemented in a given context may vary, the literature suggests that in order to be successful it must adhere to the follow six components.

1. Building capacity and accelerating the ability to learn

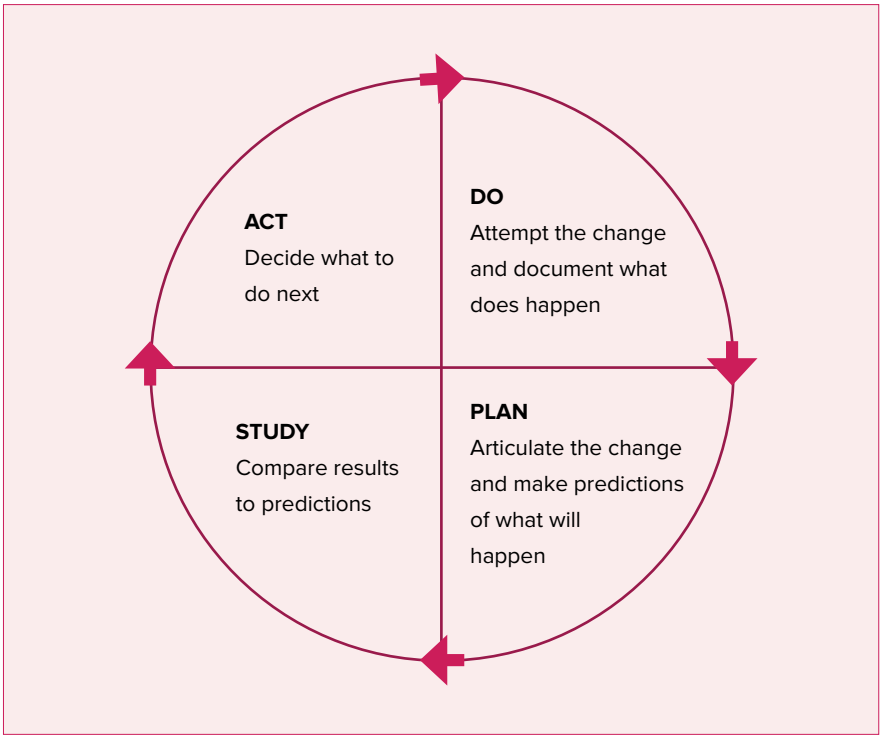
The more successful and enduring examples of improvement at scale are due not to the implementation of a particular approach or intervention but are a result of deliberate, coordinated work that builds a system's ability to improve through culture change and capacity building. A key part of innovation and improvement work must be working with educators to build their capacity to engage in the design, development, implementation, evaluation and iterative improvement of new practices and ways of working. This involves building a mindset among practitioners and a method of working within schools

that promotes effective change management processes, creates the opportunity to continuously evaluate and iteratively refine new approaches, and facilitates sustained learning, which is fed back into the system.

2. Learning cycles to develop practice-based evidence

While learning cycles may take different forms, all are characterised by the disciplined, analytic and systematic use of rigorous methods. They facilitate learning through rapid design cycles and providing the infrastructure to enable educators to move quickly from problem definition to prototyping and then to implementation and evaluation (Diagram 1).

Diagram 1



The focus is on robust evidence generation to inform next steps and ongoing actions. This involves combining existing research evidence, the applied methods of inquiry, and educators as active inquirers who operate within a robust improvement framework. Critically, effective learning cycles should leverage the knowledge of those both within and outside the immediate field or context, and integrate knowledge from researchers, practitioners and other relevant parties.

3. Data use to reinforce and inform iterative improvement

Data are critical pieces of the innovation and improvement process; they are what enable participants to determine whether a change or innovation actually leads to improvement. The capacity of schools to effectively utilise data and evidence historically has been limited by inadequate data systems that do not enable the easy collection, analysis and presentation of data, as well as limited data capabilities among educators. Poor metrics or indicators for measuring a range of valued student outcomes have further hampered data use in schools. As Yeager and colleagues argue: 'Educators need both more frequent data and also different kinds of information than they normally get – measures that can help them improve their actual practices.'[19]

The collection of data is critical to understanding whether the changes being implemented are actually leading to improvement and facilitating ongoing learning. Evidence collection should start from a working theory of improvement, and associated measures should enable real-time learning of student experiences and evaluation of whether the processes and changes being developed are actually leading to improvements in valued outcomes. As such, these measures should feed into and inform ongoing activity, decision-making and the iterative development of the particular innovation or approach. These outcome measures should be combined with process measures that provide valuable information on how the new ways of working and innovative practices are performing in diverse contexts with different groups of students and teachers [see practical measurement box].

Practical measurement

Usable evidence or practical measure has four key dimensions:

- Connected to the theory for improvement; that is, measuring valued outcomes
- Meaningful and helpful in leading to changes
- Accessible and timely
- Easy for practitioners to collect, interpret and use – need a system and the capability

4. Purposeful collaboration among different stakeholders

The power of networks to drive innovation and change comes from their ability to bring together individuals from different contexts and with diverse knowledge and expertise in deliberately structured ways. The decentralised and horizontal structure of networks arguably makes them better at accessing and disseminating knowledge and in particular bringing together the theoretical knowledge and empirical findings of researchers, the practical know-how and context-rich expertise of educators, and the specialised skills of other experts and designers. Critically, high-functioning improvement networks see non-school partners involved in the improvement work as equal collaborative partners rather than outside consultants, recognising and valuing the diverse perspectives, knowledge and skillsets they can bring to innovation and improvement work.

5. Highly structured processes and ways of working

In contrast to many education networks, which are loosely formed and governed, improvement networks are 'highly structured, intentionally formed collaborations among educational professionals, researchers, and designers, that aim to address a high leverage practical problem'.[20] Participation in intentionally designed networks for the purpose of coordinated innovation and improvement requires a set of structuring agents to guide engagement and to propel progress across the whole network. This includes established norms of behaviour and engagement, the co-construction of common goals, and collective buy-in to what are potentially new ways of working collaboratively [see four characteristics of high functioning networks].

Four characteristics of high-functioning networks

The Networked Improvement Community approach developed by the Carnegie Institute has identified four essential characteristics of a high-functioning and effective networks:

1. Well-specified common aim

The overarching aim should be supported by common targets and measurable ambitious goals that are grounded in empirical evidence about what is achievable rather than aligned with worthy but unrealistic social goals. Goals and targets also must be aligned to the specific problem and working theory of improvement determined by the network, rather than those specified by an external body or mandated from above.

2. Deep understanding of problem, the system that produces it, and a working theory for improvement

The creation of a shared language and tools for mapping both the problem context and the theory for improvement not only provides a structure to the network but also enables broader participation by identifying specific subtasks and different areas for engagement by individuals within the network. Tools commonly employed by Networked Improvement Communities include Program Improvement Maps (which encourage participants to think systemically and provide an end-to-end description of the problem they seek to address) and Driver Diagrams (which encourage participants to explicate causal thinking).

3. Disciplined methods of inquiry

Networks require common protocols for inquiry, such as the PDSA cycle or the spiral of inquiry, but also the expertise and resourcing within the network to be employing these 'properly'. Key to the effective functioning of inquiry protocols is the embedding of practical measurement and supporting data systems into the ways of working at both an individual and network-wide level.

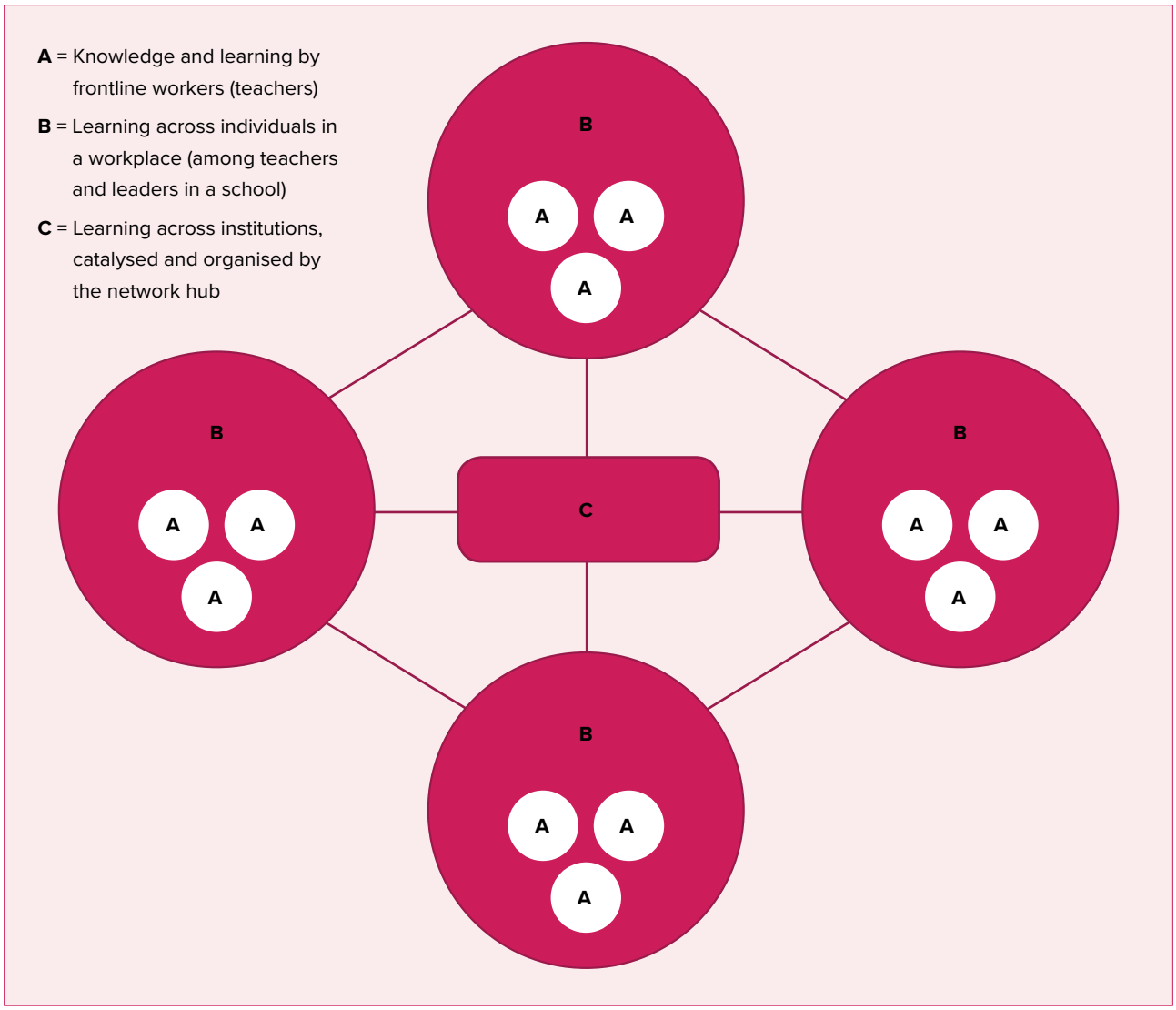
4. Organised for continuous improvement and the diffusion of ideas

Critical to the long-term success of networks is the presence of mechanisms for coordinating efforts across the diverse individuals and organisations engaged in what are often parallel but complementary activities. An ethic of continuous improvement and innovation must permeate the mindsets and activities of all members, and a commitment to learning from and leveraging the bright spots or positive deviants that emerge within the network to accelerate learning and improved outcomes.

6. Central hub support

While the strength of networks is their distributed and horizontal structure, well-functioning networks also require strong leadership. In the initial formation stages, the leadership's job is to bring together relevant stakeholders, communicate expectations, coordinate agreed norms of participation, and champion transition from formation to operation. As a network grows (both in size and in the complexity of operations and learning undertaken), the need for a central hub becomes more essential. The central hub's primary role is to initiate and integrate activity [see diagram 2]. This includes catalysing engagement; identifying potential new members; developing initial processes and structures; maintaining and coordinating knowledge management (dissemination); and supporting activity in each of the member organisations as well as cross-institutional activity and knowledge flows. Importantly, the central hub does not tend to emerge organically from network activity but rather must be purposefully created and resourced, including access to appropriate technologies to support the rapid communication of new insights.

Diagram 2: Central hub support (adapted from Engelbart)



Part III: Communities of Learning | Kāhui Ako: A vehicle for sustained, networked improvement?

Communities of Learning | Kāhui Ako (hereafter 'CoL') was introduced in 2014 as part of the government's Investing in Educational Success (IES) initiative. The espoused purpose of IES was to lift student achievement by:

- Encouraging greater collaboration between kura/schools across the schooling system
- Recognising, supporting and using professional expertise across the system where it is needed most
- Enhancing opportunities for teacher-led innovation of new and good practice, to make clearly visible what is possible, new and exciting[21]

The IES initiative conceives of CoL as mechanisms for raising achievement through collaboration and capacity building, particularly through the sharing of expertise. The design rests heavily on members' engagement in inquiry, particularly collaborative inquiry, and use of evidence and data. Professional development in inquiry and use of evidence, and support in developing collaborative ways of working are available from the various partners with whom CoL may seek to engage through the MoE. It is important to note, however, that this support is available only for limited periods, and those providing the support are external providers rather than community members. What is more, they are conceptualised as holders and disseminators of specialist knowledge and expertise in a way that may imply a hierarchical rather than horizontal relationship.[22]

In addition to support from specialist personnel, a wide range of resources is available through the MoE website, including development maps and the recently introduced Local Curriculum Toolkit, as well as tools for measurement such as the Progress and Consistency Tool (PaCT). The Education Review Office (ERO) and New Zealand School Trustees Association websites also offer a range of resources and guides to assist with the various stages of joining, forming and running a CoL. However, the onus is very much on individual communities to develop effective collaborative practices; implement robust cycles of inquiry; and ensure the sound gathering, analysis, and application of a broad range of pertinent data. The assistance and advice available are broad but also diffuse, offered through various portals, sometimes replicated across sites, and are non-mandatory. Nor are there system accountabilities surrounding the communities' effective use of collaboration, inquiry and data.

In their overarching purpose and structure, CoL appear aligned with a networked approach to improvement. However, there is growing evidence to suggest that in many instances CoL are failing to achieve collaborative processes or to effect the level of innovation or improvement that was anticipated. Indeed recent reports on the establishment of CoL have identified deep issues affecting their ability to produce desired outcomes/outputs.[23] To help understand why this might be the case, in the following section we compare the six components of effective networked improvement communities presented in Part II with the design and implementation of CoL.

Communities of Learning | Kāhui Ako: Does the design match the promise?

The government's conception and positioning of CoL appears, at least on the surface, to share much with a networked approach to innovation and improvement. This section compares the conception of CoL and what (little) is known of their current implementation with the six components of a networked improvement approach described in Part II.

Principle	Communities of Learning | Kāhui Ako
1. Capacity building and accelerating the ability to learn	
Building the capacity of educators to engage in iterative development and evaluation	While a stated aim of CoL, capacity building and developing educators' mindsets appear to be positioned as by-products of participation and engagement rather than features specifically built into the model. In a 2017 survey administered by NZCER, only 34% of teachers considered that their CoL participation was supporting their capacity for inquiry or strengthening their practice as a teacher. Principals rated slightly higher, with 48% agreeing participation in CoL strengthened their school's capacity for inquiry and 47% agreeing participating in CoL strengthened teacher capability in their school.
Building a mindset and method of working for continuous learning and improvement	
2. Learning cycles to develop practice-based evidence	
A cycle of problem identification, designing and implementing change in practice, charting progress, and the robust evaluation of impact	Inquiry is intended to be a core part of CoL. Furthermore, every CoL has to develop their own achievement challenges and a plan for addressing this. However, there have been some concerns raised that the problem-identification process was less focused on a deep understanding of the local context and more aligned with meeting criteria established by the MoE.
Employment of rigorous methods, including quick learning cycles	Inquiry is positioned as a central activity of CoL. However, as noted earlier in this report, the rigour of inquiry processes undertaken in schools remains highly variable.

Learning cycles leverage the knowledge of those both within and outside the immediate fields, and integrate knowledge from both researchers and practitioners	CoL are able to apply for support from expert partners. However, the latter's role is more focused on the process level of operation rather than on the nature of changes being designed and implemented. Furthermore, external experts are not formally part of the communities but rather function as external consultants.
3. Data use to reinforce and inform iterative improvement	
Practical measurement	Data and evidence collection and use form a key component of the work of CoL. However, the nature, quantity, quality and timeliness of the data collected by schools and communities, and the effectiveness of data analysis, interpretation and application processes, are likely variable.
Short-term measures that are embedded in the day-to-day practice and able to inform iterative progress	There are no inbuilt structures or support for generating data to inform day-to-day decision-making.
Long-term measures that build an understanding of variability of implementation and outcomes across contexts	Reporting requirements to the MoE do require CoL to be collecting data and evidence against their achievement challenges. However, the extent to which this will enable a deep understanding of variability in implementation and outcomes remains to be seen.
4. Purposeful collaboration among different stakeholders	
Educators, researchers and designers as equal collaborative partners	Educators are the primary participants in CoL, with expert partners positioned as external advisors rather than as integral and equal members of the collaborative partnership.
Purposefully and intentionally formed networks with structured membership	The MoE established certain frameworks around participation in CoL. Participation of schools and early childhood education centres appears to be based primarily on geographic proximity rather than a shared focus on a particular problem of practice.
5. Highly structured processes and ways of working	
Shared goals with common targets and measures	All CoL must submit shared achievement challenges to the MoE for approval. However, there has been some concern that these challenges align with Ministry priorities and goals rather than arising from the needs of CoL. As reported in an ERO report in 2017: 'We found that some of the earlier forming CoL	Kāhui Ako expressed frustration at having to resubmit achievement challenges because these did not meet "Ministry requirements."'

Organised for continuous improvement and the diffusion of ideas	This relies on the ability of individual CoL to establish structures, systems and ways of working to facilitate iterative improvement and the dissemination of ideas. The 2017 NZCER report on teaching practices in schools found that 78% of teachers in cross-school roles considered they had positive collaboration opportunities with other teachers. However, this compared to only 34% of teachers in non-cross school leadership roles. This suggests that while the cross-school lead positions are supporting the diffusion of ideas among schools, this is not equally impacting all teachers within a school.
6. Central hub support	
Central leadership role	The MoE has created a series of new roles for members within each CoL, such as the lead principal, the cross-school leads and the within-school leads. However, there is no central hub to support the effective operation of CoL.
Knowledge management	To date, there has been limited support, resourcing and technology provided to CoL to facilitate effective communication. This is evidenced, to some degree, by the limited training provided for CoL members, particularly those in newly formed leadership roles. As ERO reported in 2017: 'There is a clear need for specific training in the new leadership roles. The roles are unique and differ from institutional leadership at each level because they are roles of influence that require a new frame of reference to work collectively and responsively with professional colleagues and community members.'
Knowledge management	To date, there has been limited support, resourcing and technology provided to CoL to facilitate effective communication.
Cross-institutional activity	While the design of CoL supports inter-school collaboration, there are no mechanisms in place to support interaction, collaboration or knowledge sharing between CoL.

While the formation of CoL is an important step in the process of scaling educational improvement in New Zealand, the ad hoc participation of non-school members, the conceptualisation of these participants as outside experts rather than collaborative partners within the community of learning, the lack of structure and moderation around the use of the key improvement tools of inquiry and data and evidence use, and the limited support, resourcing and technology provided to CoL to facilitate effective communication and knowledge management or to support interaction, collaboration or knowledge sharing between CoL, mean that CoL are not well set up to achieve improvement at scale. Based on our review of the international literature and an examination of successful cases of improvement at scale, there appears to be much merit in a networked improvement approach that relies on a suite of routines and protocols to ensure robust inquiry and data-use practices. Furthermore, a networked approach, in which non-school partners are involved in the work of communities of learning as equal collaborative partners rather than outside consultants, also receives support in the literature.

Conclusion: Where to from here?

In order to achieve system-wide innovation and improvement, the focus in education must shift from implementation to learning. A learning system eschews a top-down policy driven approach to reform and instead emphasises the need to build capacity within the sector to learn and develop continuously. This requires a policy environment that invests seriously in the cultural and institutional infrastructures of professional practice.

Such a paradigm of innovation and improvement combines both a deep appreciation for the research evidence to inform new approaches and new learning while simultaneously rejecting a focus on universal prescriptions. It appreciates and champions the need to adjust powerful ideas to diverse contexts and diverse populations, holding a deep recognition and appreciation for pluralism in education. To achieve this, the system must empower educators to work in collaboration with each other, and with researchers, designers and other experts to create the conditions, systems and infrastructure needed to ensure our young people can thrive. These ideas are not completely new to the New Zealand education system. However, they are not currently embedded in ways that consistently drive mindsets, actions and behaviours in education.

Endnotes

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