A Collaborative Knowledge Building Strategy to Improve Educational Policy and Practice: Work-in-Progress in the Ministry of Education’s Iterative Best Evidence Synthesis Programme


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Abstract
The OECD’s Programme for International Student Assessment (PISA) reveals the third highest mean achievement in reading literacy for 15-year-old students in New Zealand. While demonstrating high mean achievement in PISA the New Zealand education system is less equitable than the OECD countries’ average. The dispersion of achievement scores is particularly wide in New Zealand (See Figure 1). Wide dispersion of achievement is a recurrent and persistent pattern for New Zealand in international comparative studies.

Overall Performance - New Zealand’s High Average and Large Variance

Figure 1. Variation expressed as percentage of average variation across the OECD

Source: OECD (2001) Knowledge and skills for life, Appendix B1, Table 2.3a, p.253, Table 2.4, p.257.


2 Source: OECD (2001). Knowledge and skills for life, Appendix B1, Table 2.3a, p.253, Table 2.4, p.257.
The policy challenge for educational improvement in New Zealand is sustainable, system-wide development that produces learner outcomes exemplifying high quality and high equity. The challenge for practice is to simultaneously educate diverse learners for success in a knowledge society.

There is a valuable but inaccessible and fragmented research literature in education about approaches that enhance or undermine social and academic outcomes for diverse learners. The focus of this paper is on a collaborative knowledge building strategy to draw upon and synthesise this literature: the Iterative Best Evidence Synthesis Programme. The approach aims to strengthen the use of evidence-based approaches in both educational policy and practice, particularly in English and Māori-medium settings in New Zealand. A fitness-for-purpose approach has driven the methodology. Because the purpose is to make a bigger difference in education, the focus is on what works, and specifically on what can be learned from the evidence about what works, under what conditions, why, and how. Attention is given to the magnitude of impact of influences.

The approach draws upon collaborative processes between researchers, policy-makers, and educators. These processes are helping to strengthen capability in research and development and to achieve policy relevance and accessibility for educators. Three national advisory groups have been established comprising synthesis writers, quality assurers, research methodologists, teacher union representatives, educational researchers and policy advisers: a BES Standards Reference Group, a BES Māori Educational Research Advisory Group and a BES Pasifika Educational Research Advisory Group. In consultation with these three groups Guidelines for Generating a Best Evidence Synthesis Iteration have been developed to support capability building and to ensure rigour in the work. Work is in progress to strengthen evidence-based approaches to using the evidence.

The initial syntheses in the series focus on the influences of families and communities, quality teaching and teacher professional development on learner outcomes. The syntheses have been made accessible on the web (www.minedu.govt.nz/goto/bestevidencesynthesis) occasioning high demand particularly from educators. While the initial focus has been on generating first iterations relating to family and community influences, and for the early childhood and schooling sectors, the programme is extending to include the tertiary sector.

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4 Alton-Lee, A. (2004). Guidelines for Generating a Best Evidence Synthesis Iteration 2004. Wellington: Ministry of Education. These Guidelines have been developed in consultation with three national advisory groups and will be reviewed and further developed in the light of what is learned through each new tranche of best evidence synthesis iterations. The Guidelines are available from adrienne.altonlee@minedu.govt.nz.

5 www.minedu.govt.nz/goto/bestevidencesynthesis/


Introduction
This paper foregrounds current and future challenges for New Zealand education policy and practice. It is argued that such challenges require fit-for-purpose knowledge building approaches to inform what works for diverse learners in New Zealand contexts. The paper outlines both the problems inherent in the task of drawing on educational research to strengthen the evidence base, and the potential of collaborative syntheses of ‘bodies of evidence’ as catalysts for multi-level system improvement.

Substantial attention is given in the paper to methodological issues. The paper advances the case for a rigorous pluralist approach to synthesising and explaining evidence about the complexity of influences on a range of outcomes for diverse learner.

Attention is also given to the need for a deepened evidence-based understanding of educational change processes. The paper outlines the Iterative Best Evidence Synthesis Programme as a cumulative and iterative knowledge building approach. The paper explains that the programme not only seeks to strengthen the evidence-base about what works, but also seeks to inform the need to be evidence-based about using the evidence-base in order to be effective.

The latter section of this paper explains how a range of iterative and collaborative partnerships and processes are strengthening both the approach to, and the impact of, this work. The paper concludes by highlighting current challenges and future directions of the programme.

The New Zealand Context
New Zealand is a small Pacific OECD country with an overall population of just over four million and a high youth population\textsuperscript{10}. The OECD’s \textit{Programme for International Student Assessment} (PISA) reveals the third highest mean achievement in reading literacy for 15-year-old students in New Zealand, but the dispersion of achievement scores is second widest out of 30 countries. Such wide dispersion of achievement is a recurrent pattern for New Zealand in international comparative studies. While demonstrating high mean achievement in PISA the New Zealand education system is less equitable than the OECD countries’ average\textsuperscript{11}.

New Zealand population projections reveal a rapidly changing demographic profile by ethnic identity. Our children increasingly bring multiple cultural heritages to their education. And, whereas the majority of learners in the early childhood and schooling systems have been Pakeha (of European heritage), Māori and Pasifika learners will constitute about 45% of our children by 2021 and the majority of our young learners within three or more decades\textsuperscript{12}. Despite high achievement for many Māori and Pasifika learners, average achievement as shown in PISA and many other assessments is lower for these ethnic groups.

The policy challenge for educational improvement in New Zealand is sustainable, system-wide development that produces learner outcomes exemplifying high quality and high equity. The challenge for practice is to simultaneously educate diverse learners for success in a knowledge society.


\textsuperscript{11} Source: OECD (2001). \textit{Knowledge and skills for life}, Appendix B1, Table 2.3a, p.253, Table 2.4, p.257.

\textsuperscript{12} \url{http://www.stats.govt.nz/}
Knowing What We Know About What Works in Education

When public policy looks to, or seeks to commission, educational research or evaluation to inform policy development, it is clear that knowing what we know about what works is fraught. There are bodies of research that influence educational practice, but do not provide rigorous evidence of a positive impact on learner outcomes. For example, there is considerable international evidence\textsuperscript{13,14,15,16} of no strongly positive (and even negative) impacts when teachers use learning styles approaches. The intention behind the approach is undoubtedly good, but even those\textsuperscript{17} who argue they have found significant evidence of effectiveness, tend to emphasise a multi-sensory approach (auditory, visual, kinaesthetic and so on) rather than a preference-matching approach.

A 2003 report by the New Zealand Education Review Office\textsuperscript{18} showed that the learning styles approach was commonly used in New Zealand schools. In a series of case studies (Higgins, 2001)\textsuperscript{19} the approach has been found to be linked to less effective instructional experiences for Māori and Pasifika than for other learners in junior class mathematics. Māori and Pasifika learners were classified as kinaesthetic learners and encouraged to work with blocks while other learners focussed on metacognitive strategies (for which there is, by contrast, strong research evidence of positive links to higher achievement)\textsuperscript{20}.

Even when it is clear that public policy needs an evidence base that is trustworthy about influences on learner outcomes, it is not easy for policy makers to systematically access such an evidence base. With notable exceptions such as the journal SET Research Information for Teachers, educators in early childhood and schooling are likely to be unable to gain ready access to research studies. The international research literature in education is widely dispersed in educational journals and tends to be specific to particular topics, particular research designs and methodologies, and located within particular paradigms. The research literature is characterised by paradigm silos (for example, between educational psychology and the sociology of education). The problems of siloing in turn constrain research literature reviews, drawing the charges of idiosyncrasy\textsuperscript{21} and untrustworthiness\textsuperscript{22} for policy purposes.

The international research provides a substantial resource for public policy in a small economy. But, when using international research, New Zealand educators and policy-

\textsuperscript{16} The term ‘learning style’ is often used loosely in practice but in this context denotes a learner’s apparent preference for an auditory, visual, tactile or other source and/or expression of information (identified through a learning styles inventory). Within this approach teachers are encouraged to match mode of information to the learner’s preference. A review by Irvine and York (1995) of evidence about 30 instruments to measure learning styles, concluded that, despite the popularity of the Learning Styles Inventory\textsuperscript{16} ‘the design strategy, reliability and validity of the inventory were largely unsupported by the research evidence’ (p.487). Riding and Rayner (1998) and McMillan (2001) highlight several concerns including distracting teacher attention from the actual learning process, and the potential to restrict opportunities to learn.
developers need to know if what the evidence indicates works in other countries would apply in the New Zealand context, given regulatory, policy, institutional, cultural, language, professional and other contextual differences.

What of our New Zealand educational research? Educational research in New Zealand tertiary institutions, with notable exceptions, is also subject to traditional siloing. An OECD Review (2001) warned of undermined social capital (in the form of networks and relationships fostering trust and reciprocity) in New Zealand educational research. Such factors can mitigate against the policy endeavour of getting professional agreement amongst researchers around evidence-based advice for improving practice (for example, in approaches to teaching reading, and around larger issues such as the agency of schools or teachers).

Further, much valuable educational research that is directly relevant to the New Zealand context has not become part of a cumulative tradition of knowledge building. Despite substantial public expenditure on postgraduate research (much of which is carried out by practising educators) research knowledge in educational doctoral and masters research studies in New Zealand is held by Universities, subject to librarian supervision if accessed, and infrequently used to inform public policy or educational practice.

The Ministry of Education’s Iterative Best Evidence Synthesis (BES) Programme

The focus of this paper is on a knowledge building strategy to assist in the project of strengthening the accessibility and use of rigorous evidence-based research in education through the Iterative Best Evidence Synthesis Programme developed by the New Zealand Ministry of Education since 2002. Its purpose is to systematically identify, evaluate, analyze, synthesize, and make accessible, relevant evidence linked to a range of learner outcomes. The aim is to do so in a timely manner to support the optimising of desirable outcomes for the diverse learners in the New Zealand education system. The overall programme requires a series of syntheses, systems-thinking about inter-relationships among influences, and attention to direct and indirect influences on outcomes (See Figure 1b on page 9).

A fitness-for-purpose approach has driven the development of the methodology. For example, because a primary purpose is to illuminate educational influences that can make a bigger difference for desirable learner outcomes, the selection criteria focus on research that links influences to learner outcomes. Because the purpose is to make a bigger difference in education, the focus is on what works, and specifically on what can be learned from the evidence about what works, under what conditions, why, and how.

To achieve its purpose to specifically inform the New Zealand context, the synthesis approach needs to foreground New Zealand educational research, triangulate patterns in the international research with the New Zealand evidence, and interrogate international research in the light of context-specific similarities and differences. Synthesis writers need to be mindful of patterns of systematic underachievement in New Zealand education, and the exceptions to these, in the selection of studies. A Responsiveness to Diversity Framework addresses current system weakness in New Zealand education (the wide dispersion of achievement) and government's need for future-focussed attention to the increasing diversity of our learners, and learner groups. This means attention to the ways in which educational processes simultaneously influence diverse learners (where all learners are included under the diversity umbrella). The responsiveness to diversity framework influences each aspect of

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24 The New Zealand Ministry of Education’s Iterative Best Evidence Synthesis Programme owes a debt of gratitude to, is inspired by, but as is explained in this paper, is quite different from Slavin’s best-evidence synthesis approach. See Slavin, R. (1986). Best-evidence synthesis: An alternative to meta-analysis and traditional reviews. Educational Researcher. 15(9), 5-11.
the BES development including the selection of studies and the analysis. Evidence-based approaches can provide strategies to enable teachers to facilitate the learning of heterogeneous groups of learners in ways that can reduce teacher stress while enhancing a range of learner outcomes across the whole group of students (Alton-Lee, 2003; Cawelti, 1999).

To achieve our BES purposes we have developed a 'jigsaw methodology' that evaluates, sorts, and synthesises evidence about influences on learner outcomes from different paradigms, research designs and so on, with attention to the wider role of contextual influences. The 'jigsaw methodology' involves bringing together pieces of the puzzle about influences on learner outcomes that are often spread over and embedded within a range of research studies. The approach calls for attention to apparently conflicting evidence for its potential to deepen understanding and illuminate the impacts of context.

Because our purpose is to understand what works in the change process, as well as in everyday practice, considerable emphasis is given to explanatory coherence and power both of particular knowledge claims and patterns of findings emerging from the synthesis. Particular weight is given to longitudinal findings indicating that achievements and social outcomes are sustained rather than transitory. Evidence from studies, whether small case studies, or larger longitudinal or experimental studies, is included in the synthesis only if there is a rigorous and credible link between the influence and learner outcomes, with some explicit exceptions.

Other research evidence such as descriptive research may be included, with qualification, if careful triangulation with other outcomes-linked studies provides confidence that the evidence adds to our understanding. For example, teacher provision of appropriate positive feedback has been found to show a particularly strong link to achievement in a range of reviews and meta-analyses of international studies (e.g. Hattie, 1999; Black and Wiliam, 1998; and Marzano, Pickering and Pollock, 2001). In a descriptive study of New Zealand practice, Carkeek, Davies and Irwin (1994) found that Māori students got markedly more frequent and positive feedback in immersion programmes than in bilingual or mainstream programmes. The triangulation of the NZ findings with the patterns in the international research suggests Māori students may have been getting less effective teaching in mainstream and bilingual settings, than in Māori-immersion settings, at least in the schools and classes studied.

The iterative BES draws on analyses of patterns and exceptions in the findings, analyses of comparative magnitude of impact of various influences, and consideration of explanatory coherence to interrogate and synthesise the body of evidence with relevance for the NZ

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31 The higher performance of Māori students at 5th and 6th form level in Māori medium and bilingual schools, compared with the performance of Māori students in immersion or bilingual units within mainstream schools in 2001 and 2002, may provide an indicator about the importance of this factor for Māori students. Minister of Education. (2001). New Zealand Schools Nga Kura o Aotearoa: A report on the compulsory school sector in New Zealand 2000. Wellington: Ministry of Education.
context. Part of the analytic task in a synthesis is to use temporal comparisons to consider how contextual influences vary across time, according to changes in policy settings, and in communities.

A fitness-for-purpose approach has also driven the format of syntheses. The language used to report a synthesis is designed to be as accessible as possible for policymakers, educators, researchers, teacher educators and educational leaders, without sacrificing necessary precision.

All governments concerned about outcomes for their learners need timely cost-effective advice to inform policy development. Accordingly, despite the intrinsically challenging nature and scope of synthesis generation, there are time constraints on development. Our approach has been to work collaboratively with synthesis writers, and to use intensive formative quality assurance to generate rigorous and valid first iteration syntheses. The principle of transparency is employed to make the methodological approach clear, and links between claims and evidence transparent (through on-page footnoting) to enable further iterative processes of scrutiny and development by the New Zealand research community and overseas research specialists. The intention of the programme is to build a successive process of updating and strengthening of the scope, comprehensiveness, validity and usefulness of the syntheses through further iterations.

The NZ Ministry of Education recognises that this work is challenging and requires capability development. The work also requires collaborative processes within the educational research community and between researchers, educators and policy-makers to achieve syntheses that are trustworthy and meet their purposes.

Three advisory groups have been established to support methodological development in the BES work: the BES Standards Reference Group, the BES Māori Educational Research Advisory Group and the BES Pasifika Educational Research Advisory Group. The groups include BES writers, quality assurers, research methodologists, teacher union representatives, educational researchers and policy advisers. These advisory groups draw on the expertise of educational researchers across New Zealand Universities, Wananga, Colleges of Education, the teacher unions and the New Zealand Council of Educational Research. A representative from the Ministry of Social Development is on the BES Standards Reference Group to ensure ongoing linkages with the Improving the Knowledge Base for Social Policy Project.

The initial role of the advisory groups has been to scrutinise, critique and further develop the methodology to ensure its fitness-for-purpose for the New Zealand context. There has been wide agreement around the need for the iterative BES programme and about its purposes in informing policy and practice. Such agreement provides a strong foundation for addressing contested issues around research selection, validity, rigour and approach. This advisory process affords a wider range of expertise to address specific issues of the validity, rigour and explanatory power of different research methods and particular research designs across research paradigms. Additional assistance has been sought from a leading academic in the philosophy of social science research to further inform the scientific realist view that has informed the BES methodology (Haig, 2004).

The Ministry of Education has collaborated with the reference and advisory groups to develop first iteration agreed guidelines for BES writers. As the approach develops, through

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use and reflection the Guidelines will evolve. The Ministry of Education has also allocated funding for advisors and formative quality assurance to the writers of the next tranche of BES iterations. Via this mechanism substantial expertise across the advisory groups is also becoming directly available to each BES development. This strategy is building social capital across the educational research community as it requires researchers and advisers who may have been somewhat siloed within their own research or educational practice interests, to engage in a shared dialogue about what works. The strategy is intended to enable a capability development strategy, to optimise the usefulness and accessibility of the BESs and to build wider ownership of the evidence about ‘what works’ across the education community.

An example of the educational research community taking a lead in this collaborative and advisory networking strategy was evident on 8 November 2004 when Professor Bill Barton and the University of Auckland Mathematics Education Unit hosted a scoping meeting for a new BES. The writers, Associate Professor Glenda Anthony and Dr Margaret Walshaw are from Massey University, the participants came from across the country and included teacher educators, researchers, teachers, and policy analysts, and the meeting was held in Auckland.

Origin of the NZ Iterative BES Programme

The iterative BES approach originated out of strategic work to develop education system indicators and to inform medium-term strategy work in policy development. The programme is itself a development from a former initiative (the Strategic Research Initiative) where policy and research sections of the Ministry of Education worked collaboratively to commission a set of nine literature reviews to better inform policy. Those literature reviews helped to identify key priorities and key themes to strengthen policy development. The Strategic Research Initiative also highlighted the potential for drawing upon a far wider research literature in informing policy and has signalled significant gaps in the evidence.

Although allowing a more systematic approach to evidence-based policy, there were inherent weaknesses in the one-off literature review approach such as those identified by Oakley (2002). This highlighted the need for policy developers and the external research community to collaborate to strengthen dimensions of rigour, trustworthiness, comprehensiveness, relevance and other fitness-for-purpose requirements through a transparent and fit for purpose methodology. Given the challenges inherent in the task and the reality that new research evidence is constantly becoming available, it was argued that an evidence-based knowledge building approach should be iterative both in the development of the methodology for creating syntheses and in the content of the syntheses.

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The *Education Indicators Framework* shown in Figure 1b depicts major influences on learner outcomes and the dotted lines depict inter-relationships between these. The framework assists with a systems approach to thinking about sustainable development in education. This version of the framework makes visible, although unclear, the role played by research and development, and the inter-relationship between these in contributing to sustainable progress in education.

A risk identified in the development of system indicators internationally has been the goal displacement that can occur in policy and practice when an indicator (inadvertently) does not focus on an influence that matters. To avoid such a risk, there is a need to be systematic in constructing an overview of the available evidence, and to identify which influences the evidence shows to make a bigger difference for all our learners.

A literature review commissioned by the Ministry of Education indicated that about 40 to 65 percent of variance in outcomes is attributable to the influences of family and communities, depending on the outcome of focus. An analysis of the multi-level studies of school and teacher/class influences showed the impact on variance at the teacher/class level to be variously 16 percent to 60 percent of the variance in learner outcomes, depending on the subject area, level of schooling, and outcome of interest. The impact on outcomes of school level influences (from 0-20.9% of impact on variance) varied considerably depending, for example, on the length of time the learner had spent in the school, the subject area, the school’s policy of allowing, or not, lower achievers to be assessed, and so on. But the school level impact was consistently far smaller than that at the teacher/class level.

This initial overview has provided a guide for a progressive series of iterative best evidence syntheses focused on the major influences on learning outcomes. The initial syntheses in the

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series\textsuperscript{40} focus on the influences of families and communities\textsuperscript{41}, quality teaching\textsuperscript{42,43} and teacher professional development\textsuperscript{44} on learner outcomes. The syntheses have been made accessible on the web (\url{www.minedu.govt.nz/goto/bestevidencesynthesis}) and available on request, occasioning high demand particularly from educators. While the initial focus has been on generating first iterations relating to family and community influences, and for the early childhood and schooling sectors, the programme is planning to extend to include the tertiary sector.

The Ministry of Education in partnership with the teacher unions and in consultation with the New Zealand Teachers Council called an open tender and selected the proposers for three new BESs:

*Teacher Professional Learning and Development (Schooling)- Helen Timperley and Lorrae Ward;*

*Characteristics of pedagogical approaches that facilitate learning for diverse learners in early childhood and schooling in Pāngarau/Mathematics- Glenda Anthony and Margaret Walshaw; and*

*Characteristics of pedagogical approaches that facilitate learning for diverse learner in early childhood and schooling in Tikanga-ā-īwi/Social Studies/Social Sciences- Graeme Aitken and Claire Sinnema.*

These BESs will also include a range of secondary analyses focussed on relevant embedded information. For example: the role of centre-home/ school-home linkages, the role of ICT and other educational resources, and the role of educational leadership in mediating impacts on outcomes.

A three-year plan is being developed as a consultative tool within the Ministry of Education and with the Education Review Office to foreshadow a programme of syntheses. The criteria for selection of new BES topics include: potential impact on diverse learner outcomes; strategic policy need in the light of education indicators and other evidence about system performance; methodological viability and resource availability. Where there has been strong representation from the sector through the advisory groups, or other consultative groups advising the Ministry of Education about need this advice is also influencing the proposed programme of BESs. The next two BESs to be tendered in coming months include a focus on quality teaching for tertiary institutions and a focus on leadership in schooling.

**An Iterative BES Programme Contributing to Sustained Evidence-Based Progress in Education**

Rather than defining Evidence-based Policy Research (EBPR) as a particular kind of research that is sufficiently rigorous to inform policy, the iterative best evidence synthesis approach identifies a sub-set of existing educational research and relevant research from other disciplines as having particular value, as a *body of evidence* for informing educational policy (and practice). That sub-set is research that provides credible evidence about influences on learner outcomes (the *what, under what conditions, why, and how*).

\textsuperscript{40} \url{www.minedu.govt.nz/goto/bestevidencesynthesis/}


Beyond the one criterion that, to be included in an iterative BES, the research method must provide credible evidence about influences on learner outcomes, the iterative BES approach necessarily takes a pluralist approach to research design and method. There are good reasons for taking a rigorous pluralist approach. This view dates back to Aristotle’s explanation that the methods of investigation need to be appropriate to the focus of inquiry:

> It might be supposed that there was some single method of inquiry applicable to all objects whose essential nature we are endeavouring to ascertain... In that case what we would seek for would be this unique method. But if there is no such single and general method... Our task becomes still more difficult. In the case of each different subject we shall have to determine the appropriate process of investigation.

Aristotle, De Anima 1: 1045

Given the complexity inherent in educational influences, there is a range of research designs and methods that can usefully illuminate different areas of focus such as teaching, initial and ongoing teacher education, educational leadership, resourcing, and the research and development endeavour itself. A synthesis approach is required that is able to interrogate and evaluate the validity, rigour and explanatory power of any particular study in relation to its adequacy to explain its phenomena of focus.

What counts as validity, rigour and explanatory power in educational and psychological research is deeply contested. For example, the hypothetico-deductive method has been critiqued for promoting the premature formulation of explanatory models, discouraging the exploratory analysis of data, focusing on theory development and providing an inadequate account of theory confirmation (Haig, 200046; 200348). Arguments have been advanced for the use of alternative statistical methods such as Bayesian statistics for the orderly revision of explanatory views49. Research approaches such as longitudinal microgenetic studies50,51,52,53 carried out in classrooms (not laboratories) that intensively trace learner experiences and changes over time provide an example of a rigorous alternative. Such studies optimise validity through multiple observational approaches (e.g. broadcast microphones, multiple videos and observers) and in-depth assessment of learning outcomes. Within micro-genetic method, prediction can offer a foundation for theoretical development and explanatory power about cause, and inter-related influences, even when those influences are not directly observable such as processes in the mind54. The use of prediction within and across microgenetic studies can assist in identifying critical variables such as the role of working memory constraints in influencing instructional effectiveness. Microgenetic

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51 Nuthall, G.A.(2000). The role of memory and the acquisition and retention of knowledge and science and social studies units, Cognition & Instruction, 18 (1), 83-139.
studies that focus on diverse learners simultaneously remind us that mean scores hide quite different learning experiences and outcomes for high and low achievers within ostensibly the 'same' teaching programme.\textsuperscript{55}

In summary, although there are good reasons for taking a pluralist approach, there is methodological contestation in outcomes-linked studies in educational research. The iterative BES approach is bringing together leading New Zealand educational research methodologists working from different perspectives to forge agreement about what counts as validity, rigour, explanatory coherence and power, adequacy and usefulness to inform policy and practice. The purpose is to generate and iteratively revise guidelines for New Zealand synthesis writers that can progressively strengthen the knowledge base.

A rigorous synthesis can offset the weaknesses and flaws inherent in particular research approaches through triangulating evidence from potentially complementary research designs and methods. As has been argued previously much outcomes-linked research in education has been carried out in a hypothetico-deductive style that fails to give sufficient weight to theory development. Explanatory theory is a vital tool for the ‘transportability’ of research-based development approaches from one setting to another. Educator/s or other agents need deep understanding to ensure that what is critical to the ‘intervention’ is not lost, while being appropriately adaptive to the learners and the new setting. Despite their flaws methods of research integration that do draw on hypothetico-deductive method and employ statistical procedures such as meta-analysis play an invaluable role in highlighting where more in-depth explanatory theory and case examples would be of most value for policy and practice.

Findings from international meta-analyses can help provide an indicative skeletal structure for an iterative BES, through revealing whether effect size across a range of experimental studies indicates that a variable of interest is linked to lower or higher mean achievement than would be predicted from ‘business-as-usual’ approaches, and signal importance through magnitude of effect. Co-operative task structures provide an example of an influence of particular interest from a policy perspective because they exemplify a teaching approach by which supports can be simultaneously intensified for high and low achievers to raise academic achievement and strengthen social outcomes. In an over-arching collation of six meta-analyses, Lipsey and Wilson (1993)\textsuperscript{56} included consideration of three meta-analyses that found effect sizes of 0.62 (N=133 studies), 0.72 (N=122 studies) and 0.75 (N=98) showing particularly strong effects on achievement of effective co-operative group task structures. Three other meta-analyses identified by Lipsey and Wilson (1993) reported far smaller effect sizes for achievement effects of co-operative group approaches all falling short of the ‘business-as-usual’ cut-off at .40 argued by Hattie (1999).\textsuperscript{57} In-depth case studies of ‘co-operative groupwork’ in the New Zealand context have revealed displacement of intellectual task engagement with a social focus (Higgins, 1998).\textsuperscript{58} These findings of variability highlight the importance of research programmes such as those led by Cohen (1994)\textsuperscript{59} that have inter-linked research and development, built on a strong empirically-tested theoretical foundation and included attention to the role of culture in education, to explain quite specifically the what, how, under what conditions and why of effective practice. Notwithstanding the strengths of Cohen’s and others work at Stanford University with


\textsuperscript{57} Hattie, J. (April, 1999). \textit{Influences on student learning}. Inaugural lecture, University of Auckland, New Zealand.


bilingual Spanish/English tasks, further research and development work is needed in the New Zealand context to illuminate the potential for an evaluated and evidence-based approach appropriate to our contexts.

The final point to make about a pluralist approach to research method is that it is vital to our shared goal of getting sustained progress in education. Policy makers and practitioners need a pluralist approach to the inclusion of research evidence in syntheses because of the kind of knowledges that are necessary to support sustained education system development. Educational change can be stimulated and supported by external interventions, regulatory conditions and other levers. Sustained evidence-based progress requires wide ownership of, and engagement in, cyclical patterns of evidence-based research and development cycles at multiple levels of a system. Taking an evidence-based approach to consideration of educational change activity, Coburn (2003)\textsuperscript{60} argues for more attention to synthesising the evidence about the multidimensional issues of ‘scaling up’ to achieve better understandings about achieving lasting educational change. She calls for attention to the inter-related dimensions of depth (requiring stronger theorising of development) and to the importance of educator ownership in enabling spread and sustainability.

**Challenges of an Evidence-based Approach to Sustained Progress in Education**

In this section of the paper, three examples of New Zealand research included in the iterative BES Quality Teaching for Diverse Students in Schooling are used to illustrate the claims made about the potential of synthesis to better inform policy and practice about what has made a much bigger difference for learners. The discussion in this section also foreshadows the kinds of questions that need to be better addressed about ‘the importance of integrating understanding about what works in implementing what works’\textsuperscript{61}.

Biddulph’s (1983\textsuperscript{62}, 1983\textsuperscript{63,64}, 1993\textsuperscript{65}) experimental study of a four-session (five hour in total) group programme to train New Zealand parents of children with reading difficulties to tutor their children at home, was relatively low cost. It produced reading gain increases across one to four reading levels that were significantly ($p < 0.001$) higher than those of a control group after three months and sustained a year later at an average level of progress for previously struggling readers. Both the target group and the control group received the business-as-usual in-school supports for learners with reading difficulties including individual assistance. Research and development were closely aligned in Biddulph’s approach which was grounded in a strong theoretical foundation and the findings elaborated and explained through detailed case studies. The experimental design using random assignment of matched students within and across schools was quite feasible because the intervention occurred out of school time. This work illustrates a critical role afforded by research-based postgraduate study in education for supporting inter-linked research and development. Perhaps the strongest indication of the success of the intervention is that across two


\textsuperscript{61} Nutley, S., Walter, I., & Davies, H. (2002). *From knowing to doing: a framework for understanding the evidence-into-practice agenda*. Discussion paper 1 St Andrews: Research Unit for Research Utilisation.


decades of word-of-mouth recommendations, it has occasioned from NZ educators, hundreds of requests for the originator to help others to implement the intervention.66.

Because this work was carried out as a masters research project by a full-time teacher adviser it did not, and normally would not, become embedded within a wider research literature in New Zealand. Through the iterative BES the significance of such work can be better understood, given the larger body of evidence, and embedded into a knowledge building process to more systematically inform policy and practice.

That the five-hour intervention is a time-effective strategy for such a substantial gain should be of interest to policy makers. But the intervention is dependent upon expert knowledge and pedagogical expertise in the implementation of the programme. The first challenge for evidence-based policy is to build a sufficient knowledge base about what it would take to train other facilitators to be able to replicate, appropriately adapt and evaluate the approach, in working with parents and caregivers throughout NZ. The second challenge is to understand what it would take to embed such an approach into a sustainable progress model. These are new research and development tasks calling for evidence about effective facilitation of professional and adult learning linked in turn to student outcomes.

Phillips, McNaughton and MacDonald (2001)67 designed a research-based intervention to strengthen literacy development for the predominantly Māori and Pasifika learners from low socio-economic status families feeding from 37 early childhood centres into twelve schools. They used quasi-experimental evaluation design with cross-sectional and longitudinal features. The results across seven measures of achievement outcome found 5 out of 7 effect sizes for reading achievement exceeded Hattie’s cut-off of .40. For those learners in the combined early childhood/ schooling intervention there was an effect size of 1.0 (i.e about a year’s achievement difference from business-as-normal). These effect sizes were evident for the data over the twelve schools despite the intervention failing in two of the schools (which of itself provides potential insights about barriers to the implementation).

This research-based intervention used cultural mismatches between teaching approach and learner experience as a resource to improve teaching, suggesting deep and complex changes in the cultural and instructional practices of teachers. In the light of the extensive research literature documenting issues of cultural capital mismatch between school and home as a seemingly insuperable barrier, this interlinked research and development signals a potentially momentous leap in our understanding of pedagogical responsiveness to diverse learners. Much of what was critical to the success of this work is deeply understood by the researchers/teacher educators involved in the intervention but not easily transferable. The synthesis highlights the policy significance of this work as breaking a long-standing pattern of wide disparity in student achievement. But, the challenges of building on, sustaining and expanding this kind of deep change through the education system are formidable.

There is a growing focus on these critical ‘transportability’ and sustainability issues in other work commissioned by the Ministry of Education68,69,70 and iterative BES processes are in

66 If you wish to follow-up further information is available at http://www.readingtogether.net.nz/ info@thebiddulphgroup.net.nz  Jeanne Biddulph she can be contacted at jeanne.biddulph@paradise.net.nz
place to synthesise understandings emerging from this work\textsuperscript{71}. To achieve sustained progress we need to understand that the issue of ‘scaling up’ is not just a matter of applying intervention logic. Rather it is a new research and development task requiring an evidence-base as substantial as that needed in the underlying evidence base about what works for learners in early childhood, classroom and tertiary settings.

The aim is to produce sustained, evidence-driven advances in the effectiveness of education. Formal education of itself is an intervention. A reductionist interventionist focus could, however, inadvertently narrow our goal of promoting the health of a whole system for all its learners, to one of fixing problems. An interventionist focus can also inadvertently promote a ‘top-down’ fixing model rather than a view of cyclical research and development that is dynamic, collaborative in practice, and pervasive within a continuous and sustainable improvement model. In such a model, high quality educator action research has a key role to play in exemplifying close inter-relationship between research and development that is responsive to specific contexts, and specific groups of diverse learners.

The third study used as an example here is an unpublished teacher action research study that would likely fail to be counted as sufficiently rigorous by proposed criteria\textsuperscript{72} for evaluating evidence-based research for policy (causality claim, explanation claim, transportability, stability, validity and variability). For example, the research role was complementary to the teacher’s primary role as teacher, gain scores were compared with previous assessment results of the learners, the theorising of the intervention was emergent, the setting was one class, and so on. McNeight (1998)\textsuperscript{73} introduced a school-home link for Samoan students within a senior secondary school classical studies class study of Roman religion, that led to her students’ achievement levels more than doubling from what they had been in previous units of work, dramatically countering a record of failed assessments.

The intervention involved students in a planned discussion with either a significant other at home or in the wider community. The focus of discussion was the associative links between what they were learning about ancient Rome and traditional Samoan culture. Each day the students would share what they had each learned. McNeight reported that the effects continued after the intervention, as family members would ask the students and teacher what they were learning next in classical studies. In effect the students’ cultural heritages became a resource, and the students themselves the strategy to access that resource. Although on its own McNeight’s study would not appear to be sufficiently rigorous to meet the proposed criteria, when considered in relation to the overall synthesis, this intervention exemplifies aspects of all ten key characteristics of quality teaching derived from the wider synthesis\textsuperscript{74}. Because it is a case study situated in teaching practice it speaks to teachers. It has been reported by educators to be an example that has immediately inspired them to use, adapt and evaluate this strategy for Pasifika learners.

An iterative BES programme aims to provide a knowledge-building tool and process that can inform policy as it returns, and explains, accounts of effective practice to educators, and others with agency in education. The aim is to engage educators, researchers, teacher educators and leaders in a stronger shared and iterative evidence-based discourse about what works that of itself encourages an evidence-based approach to practice. It is a knowledge building tool that is seen to work alongside and inform a range of larger strategies.


\textsuperscript{72}Advanced by US participants in the OECD-US Seminar on Evidence-Based Policy held in Washington D.C. in April, 2004.

\textsuperscript{73}McNeight, C. (1998). ‘Wow! These sorts of things are similar to our culture!’ Becoming culturally inclusive within the senior secondary school curriculum. Unpublished graduate research report. Wellington: Department of Teacher Education, Victoria University.

(e.g. requirements for schools to use achievement data of learners in planning and reporting, embedding iterative findings from BES within self-review processes and accountability processes for schools).

The synthesis programme is an antidote to ‘rediscovering the wheel’ cultures and a tool, along with many others (including increased research funding75), to strengthen and promote professional communities of inter-linked research and development. If it is successful then evidence of enhanced learner outcomes and enhanced equity will become evident in local and national trend indicators for academic and social outcomes. These claims about processes of system development themselves need to be subject to enlightenment through further syntheses that extend our understandings of what really does facilitate sustained progress in education. The examples given above illustrate the role iterative BES can take in informing policy development, in planning broader interventions, and as a catalyst for wider ownership to promote sustained improvement.

**Challenges and Opportunities in the Use of Best Evidence Syntheses**

The Minister of Education’s76 response to the initial BESs focussed on quality teaching and the influences of families and communities on learner outcomes was to seek a day-and-a-half retreat77 with teacher union presidents, general secretaries, leading researchers and agency officials to discuss their implications. In particular the Minister sought to establish a strong partnership between the Ministry of Education and the teacher unions in taking the BES implications forward. Out of this retreat (the Brackenridge Workshop) an ongoing partnership approach to the further development of the methodology, the development of individual BESs and the use of the BESs has been set in place. The teacher unions have asked of the Ministry of Education to make it clear in our communications that teachers are first and foremost seeking time to read the BESs.

Since July 2003 over 21,000 hits have been registered on the Ministry of Education’s BES website (where electronic copies are freely available) and over half of these have been NZ hits. Many thousands of hard copies have been requested via the website by educators and others.

There has been considerable feedback to the Ministry of Education about the potential of the BESs to assist educators to improve teaching practice. For example, after a five-term school-based programme drawing upon the *Quality teaching for diverse students in schooling BES*, the Newlands Intermediate School Principal, Wendy Es era, has reported a marked shift across the school in student enjoyment of learning across the curriculum (see Figure 2 over) and enhanced achievement. The target the Newlands staff set was that at least 75 per cent of the learners in each class should enjoy learning in at least half of their 10 curricular areas. The principal carried out the student survey at the outset of the school-based development programme and at the end of every term thereafter.

A range of strategies was used beginning with time afforded for teachers to read the BES. The principal supported in-depth staff engagement with the BES over a series of staff meetings and teacher-only days. Each staff member selected at least one of the evidence-based characteristics as a focus for professional development, teaching improvement and performance review. The use of the BES was supported, and supplemented with other relevant professional reading and ongoing dialogue amongst the school staff. In each curricular area the cycle of pre and post testing after unit teaching was also linked to a focus on in-depth development around one of the evidence-based characteristics. For example, in

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75 An additional research fund was established by government to promote research on learning and teaching along with the establishment of the iterative Best Evidence Synthesis programme (The Teaching and Learning Research Initiative).

76 The Honourable Trevor Mallard.

77 The Brackenridge Workshop, July 2003.
the latest pre and post-testing in science in 2004, Newlands Intermediate curriculum leader in science, Kathryn Siversen, linked achievement gains to the intensification of teacher use of non-linguistic representations in science to support the learning of diverse students. Wendy Esera emphasises the link between enjoyment of learning and engagement and has noted larger achievement gains occurring between pre and post-tests across the school’s ongoing assessment of learning. Returning to Figure 2 it is evident that every class in the school exceeded the target after the programme. The highest level of student enjoyment recorded for three classes before the school-based programme, was the lowest level achieved after the five terms and five classes exceeded the target indicating a profound shift in learner enjoyment of learning across the school along with the principal’s report of higher achievement gains.

The Newlands Intermediate example illustrates the key role of school leadership in creating a high trust, learning-focused environment where teacher professional learning is supported. We need to build our knowledge through a whole range of case studies of change and development processes that work in New Zealand contexts. However, there has also been feedback about superficial and unhelpful use of the BES. For example, engagement around the executive summary only without reference to the examples of evidence-based practice that bring the principles to life in ways that are genuinely helpful to teachers. The Secondary Principal’s Association of New Zealand has worked with the Ministry of Education on an article to assist principals and other educational leaders to think through an evidence-based approach to using the evidence in ways that are respectful of educators and result in real improvements in practice.78

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78 Alton-Lee, A. (2004, August). Using best evidence syntheses to assist in making a bigger difference for diverse learners. spanzjournal, spanz@xtra.co.nz
The BESs have also played a key role in the Joint Work Programme of the Ministry of Education and the Education Review Office. ERO drew upon the BESs in the development of its new evaluation indicators and reviewers have used the BES as a resource in ERO’s shift to an assess-and-assist role since 2003. ERO reports on Māori Student Achievement in Mainstream Schools79 for 2003 and 2004 revealed a shift away from the commonly observed focus on learning styles (a practice shown to provide less effective instructional opportunities for Māori learners within the BES) over the period between the two reports suggesting the possibility of some system-wide influence relatively quickly. Although a lesser prevalence of likely ineffective practices is a small step on the way to increased system-wide prevalence of far more effective pedagogical approaches.

Within the Ministry of Education’s Curriculum Project a group of teacher educator/researchers have been commissioned to develop a pilot toolkit to assist teachers by providing more information about transformative case studies.

Within the Ministry of Education the best evidence syntheses have played a key role in informing the Statement of Intent, and forging alignment around broader strategy and policy development, although much of this work is in early stages, as is inter-agency dialogue focussed on the BESs.

This paper affords a welcome opportunity to extend a formal thank you to so many New Zealand teachers, researchers and teacher educators who are engaging with, and advising on, the new BES developments. Through using an iterative process we are able to attend to your advice and strengthen this work accordingly. Thank you.

Forthcoming BESs will strengthen our access to the evidence about deep educational change and development processes. As we evaluate and critically reflect upon progress to date and the deepening knowledge about change processes, while drawing upon the iterative and collaborative processes that are integral to BES development and use, we are progressively able to use the BES series as a tool to strengthen educational policy and practice.