Llywodraeth Cymru
Welsh Government

The National Strategy for Educational Research and Enquiry

Developing an evidence-informed education profession in Wales: a review of research evidence

Research

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Developing an evidence-informed education profession in Wales: a review of research evidence

Audience Educational professionals, researchers and policymakers.

Overview The Welsh Government's 'National Strategy for Educational Research and Enquiry' sets out a vision for developing an evidence-informed education profession in Wales. This evidence review considers the academic literature in this field and the experience of 8 nations that have undertaken developments in this area. Based on its main findings, it provides recommendations on how an evidence-informed education profession can be developed in Wales.

Action required This document should be of interest to policymakers, educational professionals and leaders in ensuring that educational practice in Wales becomes increasingly evidence-informed.

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Related documents	The National Strategy for Educational Research and Enquiry

Mae'r ddogfen yma hefyd ar gael yn Gymraeg.
This document is also available in Welsh.

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Executive summary

1. This report reviews UK and international evidence on how educational practitioners are:

- Encouraged to use research evidence to inform their practice.
- Able to participate in research activity through professional enquiry.

2. The review was commissioned to inform the Welsh Government's National Strategy for Educational Research and Enquiry and in particular the domain of the strategy focused on the development of an evidence-informed education profession in Wales.

3. The following methodology was used in undertaking the review:

- A systematic search of relevant research literature.
- Case study work on research schools in England.
- Interviews with leading academic researchers, practitioners and educational professionals.

4. The main findings of the review are:

4.1 National and local government plays a key role in developing and sustaining research and enquiry activity in schools, including the commissioning of ongoing evaluations of its impact.

4.2 This is most effectively achieved through collaboration between higher education institutions, schools and networks of schools to:

- Develop the confidence and skills of practitioners.
- Assist in embedding research evidence into practice.
- Make existing research evidence accessible to practitioners via a variety of formats.

4.3 School leaders play a critical role in this process through:

- Developing a culture within their schools that supports the use of research and enquiry.
- Ensuring that time and space is available to practitioners to undertake these activities.

4.4 Teachers’ research and enquiry skills developed in initial teacher education should be reinforced and expanded through career-long professional learning.

5. The recommendations of the review in relation to the development of the Welsh Government Strategy for Educational Research and Enquiry are:

5.1 The Welsh Government, local authorities and Regional Education Consortia should:

- Offer sustained support to the development of an evidence-informed education profession in Wales.

- Commission ongoing evaluations of the impact of this development on teacher practice, pupil outcomes and system improvement.

5.2 Higher Education Institutions should be funded to work with schools, networks of schools and local authorities/Regional Education Consortia to provide the infrastructure for an evidence-based profession.

5.3 School leaders should ensure a culture that supports the use of research and professional enquiry is present within their schools.

5.4 Higher Education Institutions, local authorities and Regional Education Consortia should work closely together to provide career-long professional learning that develops the research and enquiry skills of teachers.

1 Introduction

1.1 This review explores how UK and international models and approaches to evidence and enquiry-based educational practice could be used to develop an evidence-informed education profession in Wales. It looks to make recommendations for building educational research capacity in Wales by informing specific aspects of the Welsh Government's *National Strategy for Educational Research and Enquiry* (NSERE).

1.2 Recommendations from a recent report by *The Royal Society* and *British Academy* (RSBA; 2018) suggest that there is an increasing need for the teaching profession to be research-informed; that is, to 'engage with, or participate in, research and other professional development activities' (RSBA 2018: 11).

1.3 Currently, the education research landscape in Wales is vast and varied. Programmes such as the *National Professional Enquiry Project* (NPEP), offer professional development opportunities for practitioners in Wales. However, evidence suggests that in the past, education practitioners in Wales have not consistently used educational research in practice (RSBA 2018).

1.4 Throughout this review, the term 'educational practitioner' is used to encompass a multitude of individuals who work in education: teaching assistants, support staff, classroom teachers, school leaders and headteachers. The term 'educational professionals' is used to refer to these practitioners, as well as policy makers, local authorities, external educational professionals (i.e. Educational Psychologists etc.) and education inspectors.

1.5 The review is presented as follows:

- Firstly, the methodology employed in the evidence review is presented.
- Next, a short literature review explores the idea of what it means to be 'research literate', what is meant by the multiple and varied terms used to explain the idea of 'evidence-informed' educational practice, and what the current capacity for research-informed practice looks like in Wales.
- The review then continues by presenting a series of case studies which examine models of evidence-informed educational practice in other parts of the UK and internationally.
- Finally, the review draws together some main findings and recommendations for the development of evidence-informed educational practice in Wales.

2 Methodology

2.1 The following methodology was used in producing this review:

- A systematic search of relevant research literature.
- Case study evidence from research schools in England.
- Interviews with leading academic researchers, practitioners and educational professionals.

Systematic Evidence Review

2.2 A review of the available literature was conducted to explore other UK and international models of research-informed educational practice, and levels of engagement with research and evidence in the education context. The review considered the extent to which research is embedded in education systems and explored the factors that influence and build capacity for research engagement within education.

2.3 The search criteria used for the systematic literature review were:

- What models and approaches are being used to create an evidence-informed teaching profession in other parts of the UK and internationally?

- How could these models help to inform the development of evidence-informed educational practice in Wales?

- How could findings from this review be used to inform and develop a sustainable model of evidence-informed practice in Wales?

2.4 Taking the above research questions and Cook *et al.'s* (1997) systematic review definition into account, this review searched for relevant evidence reports and references from 2005 onwards.

2.5 Where databases allowed, phrase searching was employed to locate literature across the following sources: British Educational Research Association (BERA), Organisation for Economic Co-operation and Development (OECD), The Royal Society, English, Northern Irish, Scottish and Welsh Government websites (including archived pages, professional association outputs and data publications etc.), case study country government websites, Cardiff University library search, Welsh Government library search, Google Scholar, and the Education Resources Centre (ERIC).

2.6 The selection criteria were guided by the terms of reference for the project and, where possible, assessments about the relevance, quality and strengths of the evidence were made. Key criteria included:

- Relevance to the Welsh context
- Aim and design of the education strategy

- Quality of data and analysis
- Reliability of claims and associations based on the evidence presented

2.7 It was not always possible to apply all the above criteria to every source. However, a pragmatic approach was taken to assess the quality of the evidence found and its relevance to the report aims based on the information provided in the text. The primary nature of these texts was policy-style documents and/or international evidence reports that discuss and analyse the usage, capacity and implementation of research evidence in educational contexts.

Case Study on Research Schools in England

2.8 The first case study for this report focused on research schools in England. Alongside headteachers from Cohort Three of the *National Academy of Educational Leadership in Wales*, I attended three meetings led by the *Education Endowment Fund* (EEF) and headteachers from the *Research Schools Network*. These meetings provided key insight into how research schools operate in England, the aims and purposes of the research schools, and the different approaches taken to embedding research evidence and enquiry in the classroom. These discussions also provided key vocabulary and phrases from which I could expand searches of the literature.

2.9 For example, terms/phrases used repeatedly in these discussions included: research-informed, evidence-based, professional enquiry, time capacity, research specific practice, evidenced teaching, networking, collaborative opportunities, research model, enquiry strategy and impact-focused evidence. These terms provided a base from which I could further explore the literature and understand if and how similar terminology was used in other countries.

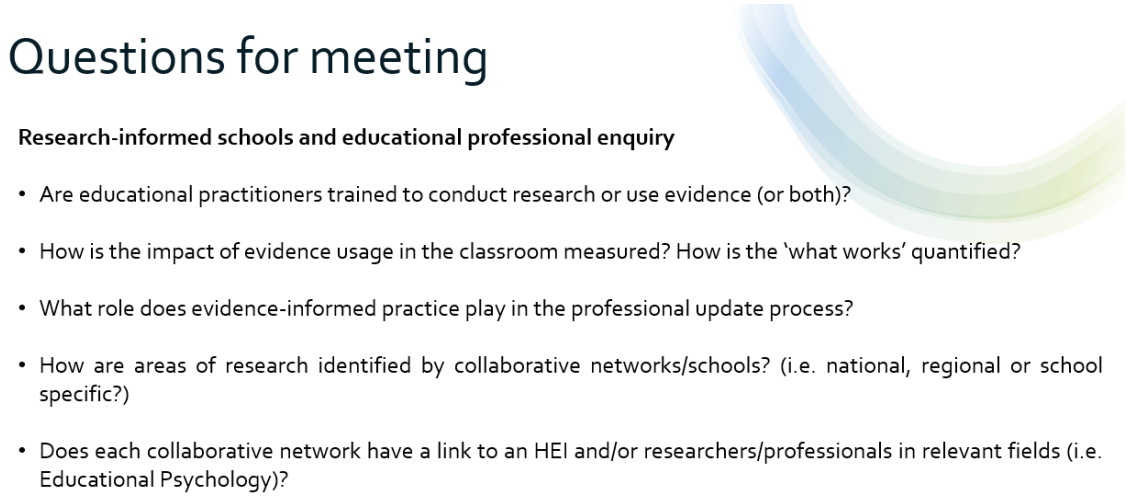
Discussions with key stakeholders

2.10 To support findings from the literature searches, I also interviewed key education researchers and had online email discussions with key stakeholders. These interviews and discussions were largely informal, semi-structured discussions that took place through Teams or Zoom.

2.11 Findings from the literature review were used to prepare key questions/discussions points (see Figure 1 below). The aim of these interviews was to deepen knowledge and understanding about specific policies, models, practices and/or the logistics of building educational professional enquiry capacity. The interviews also provided an opportunity to check that no key literature had been missed during the searches and to further understand the influence of cultural and/or socio-economic aspects of approaches to building educational research capacity.

2.12 Notes/minutes of the meetings were kept to capture key information. No audio/video recordings were taken. Interview and discussion participants included:

- Cohort three of the National Academy of Educational Leadership in Wales
- Welsh Government education policy advisors
- Headteachers from pioneer schools in Wales
- Professionals from the Education Endowment Fund
- Research schools in England
- Researchers and academics from universities across Wales
- Researchers and education policy advisors from Ontario, Scotland, Northern Ireland, Finland and New Zealand



Questions for meeting

Research-informed schools and educational professional enquiry

- Are educational practitioners trained to conduct research or use evidence (or both)?
- How is the impact of evidence usage in the classroom measured? How is the 'what works' quantified?
- What role does evidence-informed practice play in the professional update process?
- How are areas of research identified by collaborative networks/schools? (i.e. national, regional or school specific?)
- Does each collaborative network have a link to an HEI and/or researchers/professionals in relevant fields (i.e. Educational Psychology)?

Figure 1. Example of questions asked in discussions with stakeholders.

2.13 The information captured from these interviews and discussions was used to conduct additional literature searches and/or to interpret findings from the literature. These findings are reported on in each of the relevant case studies.

3 Literature Review

Developing an Evidence-Informed Education Profession in Wales

3.1 Whilst their report focuses on initial teacher education, Gleeson *et al.* (2012) offer an important definition of what building research capacity means. They suggest capacity-building, 'attempts to enhance individual and collective research expertise in pre-service teachers through critical understanding of educational research purposes, methods, skills and application and the critical capacity of educators to inquire into practice' (Gleeson *et al.* 2012: 5).

3.2 This need to develop educational research capacity in Wales was identified as a key recommendation in the OECD's 'Improving Schools in Wales' report (2014). This report illustrated that the need for practitioners to 'engage with, or participate in, research and other professional development activities' is ever-increasing (OECD 2014: 129). In particular, it identified a particular need to 'build teachers' professional skills to adequately respond to the individual learning needs of students' (OECD 2014: 25).

3.3 Additionally, Estyn has noted that 'the best schools use evidence-based research' and that effective 'leaders support the development of a culture of inquiry and help teachers to develop and apply their research skills' (Estyn 2017: 21).

3.4 This evidence, combined with findings from the 'Harnessing Education Research' report which highlights the need for research evidence to be used as an integrated element of the educational 'ecosystem' (RSBA 2018), illustrates the need to build educational research capacity and educational practitioner evidence and enquiry skills in Wales.

3.5 The Welsh Government recognised this need in its action plan – 'Education in Wales: Our National Mission' – which articulates an aspiration for the teaching profession to be 'research-engaged, well informed and learning from excellence' (Welsh Government, 2020: 11).

3.6 At a Welsh Government/British Education Research Association (BERA) conference in 2018, the Minister for Education, Kirsty Williams, pledged, 'we will develop career-long professional learning embedded in evidence-based research and effective collaboration' (BERA 2018).

3.7 Alongside other developments such as the *National Professional Enquiry Programme,* the reforms of initial teacher education, the development of the new school curriculum and the *Schools As Learning Organisations* project, this pledge is being taken forward through the development of a *National Strategy for Educational Research and Enquiry.*

What Does it Mean to be 'Evidence-Informed'?

3.8 In the UK there is increasing recognition of the need for teaching to be a 'research-literate profession' (RSBA 2019: 11). Extensive literature searches suggest that there is currently a limited bank of research that explores the levels of understanding practitioners have when searching for and interpreting academic and/or evidence-based educational literature. However, the literature that does exist illustrates the complexities of practitioner capacity and engagement with educational research evidence. It highlights the need for practitioners to have dedicated time to explore, synthesise and implement evidence in the classroom.

3.9 For example, in their survey of 312 Welsh, Scottish and English nursery, primary and secondary school teachers, Williams and Coles (2007) found that practitioners' 'research literacy' may be a factor limiting teachers' use of research evidence. Responses to this survey suggested that practitioner attitudes to the use of research evidence was largely positive. However, there were key factors, such as a lack of time and access to relevant academic resources that were inhibiting this line of professional development.

3.10 Williams and Cole (2007: 205) also found that teachers valued the internet as a source of ideas and knowledge. This was partly due to ease of access, but also because it was reported as a 'trusted' and credible source'. Whilst the internet and some web sources can be highly valuable sources of research evidence findings and pedagogical recommendations, it seems crucial that accessible, reliable portals and education research dissemination networks are developed and used to provide practitioners with access to relevant evidence and information.

3.11 This is supported by findings from Cooper *et al.* (2017), whose research on evidence-informed teaching practice in Canada found that robust networks which share research evidence help to 'filter', translate and disseminate key research findings into action are fundamental to the development of practitioner research literacy.

3.12 In their exploration of teacher's engagement with research, Walker *et al.* (2019: 6) also found that academic research had only a 'small to moderate influence on teachers' decision making'. Instead, this study found that teachers were 'much more likely to draw on ideas and support from their own experiences or the experiences of other teachers/schools and non-research-based CPD' (Walker *et al.* 2019: 6).

3.13 Additionally, evidence from the Education Endowment Foundation (Speight *et al.* 2016) revealed that teachers who took part in the 'Research into Practice' project found it difficult to engage with academic literature that could inform their practice about giving pupils feedback. Whilst the project illustrated that attitudes towards integrating research evidence into practice improved, there was no evidence that teachers were more likely to use research in their practice after the pilot study was complete. Teachers reported that they found it difficult to understand how best to use the literature and how it was relevant to what they were doing in their classrooms.

3.14 As explored further later in this review (section 9), evidence from Ontario, Canada, suggests that whilst accessing and translating literature into classroom practice is a significant challenge for practitioners, this may be a multifaceted issue. Locality and context should be considered in conjunction with access to the literature; not every piece of evidence will suit the context of every classroom.

3.15 Findings from the RSBA 'Harnessing Educational Research' report also found that teachers repeatedly indicate that their working conditions do not enable them to spend time reading research to improve their understanding or to determine how to use it to adapt their practice (RSBA 2018: 11).

3.16 It seems fundamental, therefore, that these activities fit around the day-to-day practice of teaching, but practitioners are also provided with the support and training required to interpret and evaluate the literature accessed. This suggests that as Wales moves to embed more evidence-informed practice into its education system, considerations about access, the language used, training and support provided to find and evaluate these sources are fundamental facets of building educational research capacity.

Defining key terms.

3.17 Having discussed the idea of what it may mean to be 'evidence-informed', it is important to discuss and define the terms used to explain how practitioners may develop their skills by using evidence and enquiry in education. In each of the case studies, this review reflects the terminology that is used in official documentation from that country. For example, New Zealand uses 'inquiry', whereas England uses 'enquiry'; Singapore uses 'research-informed', whereas Scotland uses 'evidence-based'. It is important to understand, therefore, the differences between these terms.

3.18 Evidence suggests that the differences between these terms are minimal. However, according to the Chartered College of Teachers, 'evidence-based practice' is about bringing together academic research, professional experience, judgement, evidence and data from within your own teaching context.

3.19 A definition of 'research-informed' practice from Lingard and Renshaw (2009: 26), suggests that a difference in these terms could be the practical element of educational research usage. To be 'research-informed' one must have knowledge about a specific subject/topic and this informs their approach of philosophy to practice (Lingard and Renshaw 2009: 26).

3.20 The definition of ‘evidence-based’ referred to above, however, suggests a more practical and collaborative approach to putting this research into action. In most respects, however, the two terms appear to be intrinsically linked and are used throughout the literature interchangeably. In developing the NSERE in Wales the consensus position that has been arrived at is to use the term ‘evidence-informed’.

3.21 Similarly, there are also minimal differences between definitions and uses of the terms ‘enquiry’ and ‘inquiry’. The general Teaching Council for Scotland defines professional ‘enquiry’ as a ‘finding out’ or an investigation with a rationale and approach that can be explained or defended (see Scottish model of enquiry here). They suggest that findings can then be shared so it becomes more than reflection or personal enquiry. Pedaste *et al.* (2015) define ‘inquiry’ as an act of asking for information to conduct an investigation.

3.22 In some of the countries that provide case studies for this review these terms are used interchangeably. In Wales, using ‘enquiry’ is intended to offer practitioners the opportunity to take the ‘critical and informed view of research’ that Etsyn (2017: 21) points to.

4 England

4.1 The idea of research-informed practice in education in England has a long history. In 1996, for example, David Hargreaves, (formerly Chief Inspector of the Inner London Education Authority, but at the time a Professor at the University of Cambridge), outlined his vision for a research-led profession and suggested reforms to the way the research agenda is set and managed and research is funded. His speech proposed a *National Educational Research Forum* (NERF) which would 'create a national strategy for educational research', and 'establish a continuing dialogue between all the stakeholders and to shape the agenda for educational research and its policy implications and applications' (Hargreaves 1996).

4.2 The Education Department in England responded to the speech by commissioning a report on the research-policy-practice system (Hillage *et al.* 1998). From this report, key issues were identified, including the lack of dissemination of research to practitioners and policy-makers and the shortage of time and support faced by policy-makers and practitioners to access research.

4.3 The first phase of the NERF then took place, and the Department for Education in England joined a number of other OECD countries in 2000 by commissioning an independent study of its research system. The OECD (2003) report 'Examination of education research and development in England' recommended that research capacity be increased and this should be linked to system-wide continuous improvement.

4.4 Government funding for the NERF ceased in 2006 but it was followed by the *UK Strategic Forum for Research in Education* (SFRE) initiative which ran from 2008 – 2010 focusing on the way educational research is generated and made available for application, as well as on its actual use.

4.5 Other initiatives that have been developed in England include:

- *Teaching and Learning Research Programme* (2000 – 2011). An initiative by the *Economic and Social Research Council* (ESRC) which preceded the launch of SFRE. It was the largest ever programme of research into pedagogy in the UK and investigated issues of user involvement, impact and capacity building. It also aimed to engage users in its work, design projects for impact on practice and policy, enhance research capacity, and launched a research skills training programme.

- *Education Endowment Foundation* (EEF). This is considered further below.

- *ResearchED*. This is also considered further below.

- *EPPI Centre*. The *Evidence for Policy and Practice Information and Co-ordinating* Centre is located in the Institute of Education at University College

London. It undertook systematic reviews in education from 2000 – 2010. This project was mainly funded by the Department for Education and has produced 50 reviews on education topics and led the formation of the international network *Evidence Informed Policy and Practice in Education in Europe* (EIPPEE) with initial funding form the European Union.

- *What Works Centres.* A number of *What Works Centres* were created by the coalition Cabinet Office in 2013. These centres work for multiple purposes (i.e. health and social care). The Government's current education *What Works Centres* are the EEF and the Sutton Trust.

The Education Endowment Foundation

4.6 The *Education Endowment Foundation* (EEF) was established in 2011 by the *Sutton Trust*, as a lead charity in partnership with *Impetus Trust* with a £125 million founding grant from the Department for Education. The aim of the EEF is to:

- raise the attainment of 3-18 year-olds, particularly those facing disadvantage;
- develop their essential life skills; and,
- prepare young people for the world of work and further study (EEF website 2020).

4.7 In 2012, Campbell and Levin presented a discussion paper for the EEF which examined evidence about educational research and evidence-based practice. It looked to understand how the EEF may operate to meet their aims. In this paper, Campbell and Levin (2012: 3) explain how evidence has shown 'over several decades that research findings do not automatically inform or shape policy or practice, and that without specific efforts to strengthen the connections between schools and researchers, even the most powerful evidence will have only limited effect'. Taking this evidence into account, Campbell and Levin (2012: 9) suggested two primary areas of development in England:

- Developing stronger networks *among* and *between* educators, research and intermediary organisations.
- Developing capacity *within* schools to find, understand, share and act on research.

4.8 To address these areas, Campbell and Levin proposed a 'knowledge mobilisation framework' (see Figure 2) that the EEF could use as a foundation from which to support schools and practitioners in becoming evidence-based and research literate. The framework illustrates a cross-institution and collaborative working approach to evidence-based research and enquiry.

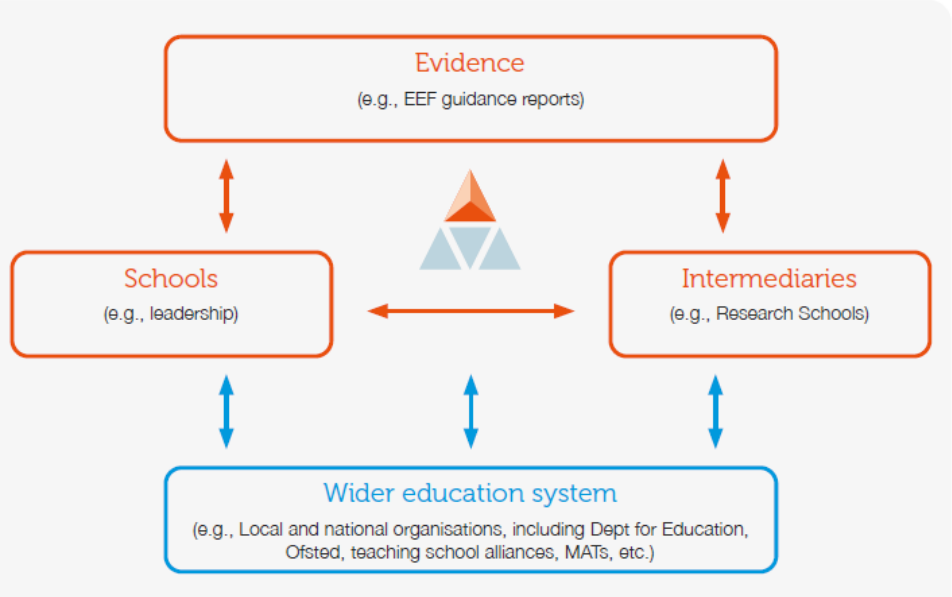


Figure 2. 'Developing Knowledge Mobilisation to Challenge Educational Disadvantage and Inform Effective Practices in England' (Campbell and Levin for the EEF, 2012).

4.9 Combined with the knowledge mobilisation framework, these areas were used by the EEF as a foundation from which to develop their primary aims:

- Summarise the 'best practice' evidence in plain language for busy, time-poor teachers and senior leaders.
- Generate new evidence of 'what works' to improve teaching and learning, funding independent evaluations of high-potential projects.
- Support teachers and senior leaders across the country in using this evidence to achieve the maximum possible benefit for young people (EEF website 2020).

4.10 The EEF conducts ‘rigorous evaluations of innovative projects aiming to raise pupils' attainment’ by using randomised controlled trials and other experimental designs (EEF website 2020). The EEF supports schools in developing and leading these research projects, by helping practitioners create between school and Higher Education Institutes and other research organisation partnerships.

4.11 The EEF has identified that the principal challenge for schools and practitioners is a lack of time and resources to implement evidence-based improvements (EEF 2019: 28). Therefore, the training and resources the EEF offer are designed specifically with busy practitioners in mind. The research conducted is then disseminated through the *Teaching and Learning Toolkit* (TLT), which is now used by 70% of secondary schools (EEF 2019). The TLT synthesises thousands of educational research studies into 35 topics. It aims to present the ‘best bets’ for improving children and young people’s attainment in ‘readily understandable language’ (EEF 2019).

4.12 To support the translation of this theory into practice, in 2016 the EEF established in collaboration with the Institute for Effective Education at the University of York, the *Research Schools Network (RSN)* which specifically aims to help practitioners develop research literacy skills, learn how to conduct evidence-based enquiry and embed these approaches into the classroom.

4.13 The network currently comprises 39 research schools, whose purpose is to champion the use of evidence to improve educational practice. These schools are also expected to communicate research findings accessibly, offer training on various aspects of practice based on the evidence of what works for professional development, and offer other schools support in undertaking research designed to improve pedagogical practices.

4.14 In 2019, an evaluation of the the first cohort of five Research Schools (RSs) was led by researchers from the Institute of Education’s at UCL’s Centre for Educational Leadership. The evaluation examined the experiences of these RSs in their initial three years to understand whether the RSN approach is viable way of supporting schools to develop evidence-informed practices at scale.

4.15 The research found that RSs were perceived by participating teachers and school leaders as playing a vital role in a systemic shift towards evidence use (Gu *et al.* 2020). Their activity was seen as a platform for the further advancement of staff professional development and capacity building, and an important source of support for increased understanding, awareness and use of emerging research and evidence-informed practice in schools. Participation in RS led training programmes was found to have had a tangible impact on many participants’ understanding of the value of evidence-based practice, and how to access and use it to inform most decisions about their professional practice (Gu *et al.* 2020).

4.16 However, the research also reported variation in the perceived impacts across different school contexts with respondents from 'outstanding' schools more positive about the impacts related to leadership support and collaboration between colleagues, than those from disadvantaged schools (Gu *et al.* 2020). Furthermore, the evaluation suggested that 'scaling-up' efforts would need to further consider the variation in school contexts (i.e. pupil intakes and performance profiles), as well as how the 'political, cultural, professional and leadership capabilities of the school shapes the process and outcomes of the evidence use' (Gu *et al.* 2020: 9).

4.17 Following this evaluation, the EEF has begun new work which aims to provide direct support to schools across the country. It looks to use the expertise and collaborative partnerships of the existing RSN to further improve teaching practice. Additionally, the EEF has set-up teams across the regions of England whose role it is to work closely with key local partners and develop evidence-informed communities of practice, focusing particularly on deprived areas. In co-ordination with the government and other key stakeholders, this work is to be supported by nation-wide campaign messages so that there is shared understanding and support for schools to receive and act on EEF recommendations.

ResearchED

4.18 *ResearchED* aims to bridge the gap between research and practice in education. It is a grass-roots, teacher-led organisation that was started in 2013 by Tom Bennett and Helene O'Shea. One of the key purposes of *ResearchED* is to raise the research literacy of educators in order to help them develop the critical skills necessary to challenge and understand the quality of research they encounter (ResearchED website 2021). To do this, the organisation runs day-long events which brings researchers, teachers, and policy makers together for a day of information-sharing. These events now also take place internationally.

4.19 At a *ResearchED* event, there are usually six or seven rounds of sessions. Each session is 40 minutes long and attendees build their own day using the timetable and programme that is released a couple of weeks before the day of the event. Additionally, *ResearchED* has a magazine which collates the latest educational research evidence in language that is accessible to its practitioner audience (see an example, here).

4.20 *ResearchED* supports practitioners of all levels, but also highlights the importance of school leaders in the development of a school research culture. In an article written by founder, Tom Bennett four years after *ResearchED* began, he states, 'leadership is still the biggest lever in driving evidence adoption. One evidence literate school leader cascades far more than one teacher' (Bennett 2018). This statement offers an interesting school-level perspective that is difficult to access in some other policy-led initiatives.

Department for Education Initiatives

4.21 In 2014, the Department for Education (DfE) commissioned a two-year study to assess progress towards an evidence-informed teaching system (see study here). The investigation was carried out by researchers from Sheffield Hallam University, University College London's Institute of Education, and Durham University.

4.22 For the first part of the review, researchers conducted a review of key literature examining the relationship between engagement with research evidence and teaching, and interviews with leaders of seven projects that were all aimed at developing aspects of research use in England. Secondly, a content analysis was conducted to examine the extent to which evidence-informed teaching is discussed in the public domain. To conduct this analysis, the following documentation was used: a set of 75 policy documents produced by government and other policy actors; websites of 65 teaching schools and 100 randomly chosen schools, compared at two time points and social media outputs referencing evidence-informed teaching and specific outputs of known influential educational social media users.

4.23 Finally, researchers conducted a set of qualitative interviews in primary, secondary and special schools consisting of:

- Case studies of 15 schools selected to give a range of levels of engagement with evidence-informed teaching.
- Interviews with senior leaders and teachers in five schools identified as being highly engaged with research.
- Interviews with leaders from three further schools that had previously been strongly engaged with research but appeared to have poorer outcomes than would be expected.

4.24 The findings from this study are shown below in Figure 3.

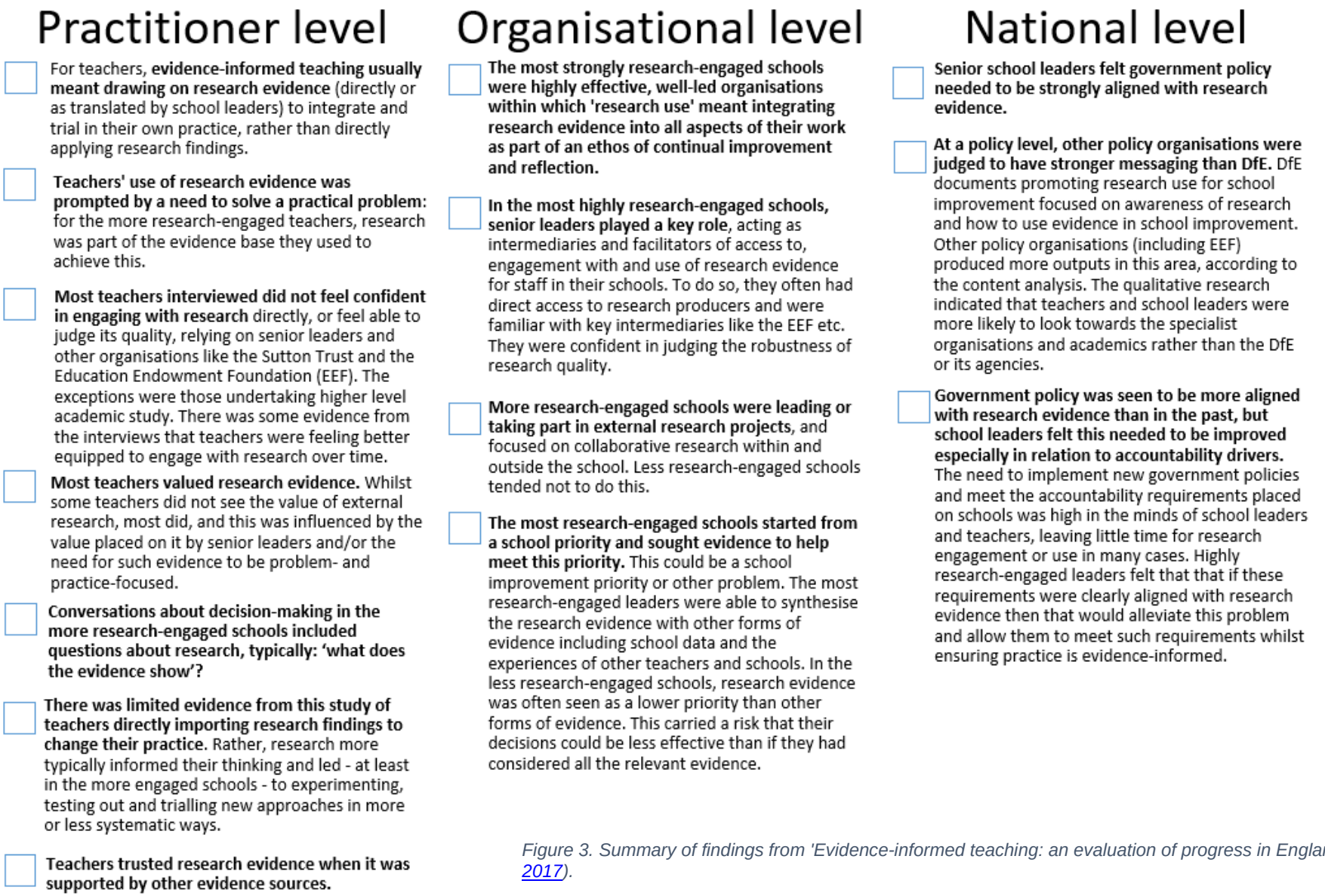


Figure 3. Summary of findings from 'Evidence-informed teaching: an evaluation of progress in England' (Coldwell et al. 2017).

4.25 The above findings suggest that school leaders play a key role in creating a research culture environment within a school and are important facilitators in helping practitioners access and engage with research. They show that practitioners value educational research, but need support with building confidence in interpreting and evaluating relevant literature.

4.26 Overall, the evaluation recommended that the DfE further support the progression of evidence-informed teaching by:

- Supporting continued relevant research into effective evidence-informed practice.
- Considering more ways of building on Teaching School leadership of evidence-informed practice in the system.
- Encouraging senior school leaders to support evidence-informed teaching.
- Finding ways to strengthen school-university partnerships, including in relation to Initial Teacher Training.
- Aiming to embed research evidence in the professional discourse and practice of teaching.
- Aiming align policy changes with the best research evidence available (Coldwell *et al.* 2017).

Summary

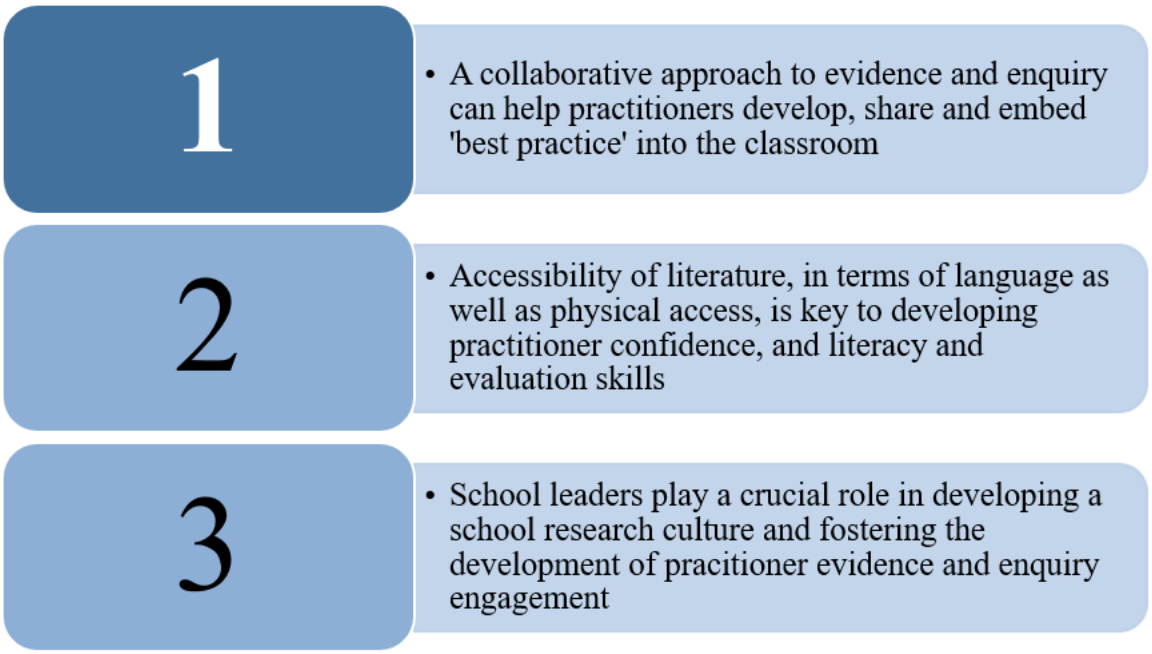


Figure 4. Key evidence take-aways from the England case study.

5 Scotland

5.1 Scotland has not previously had a strong infrastructure for integrating evidence-informed research into practice (RSBA 2018: 38). However, at the request of the Scottish Government, in 2010, Donaldson conducted a review of teacher education (see report here). One of the key findings and recommendations to come from this report was that practitioners in Scotland should engage in regular and meaningful professional learning as part of their normal activity (Donaldson 2010).

5.2 The Scottish Government accepted this recommendation and, as such, have looked to incorporate a greater focus on professional development, with practitioner enquiry a key facet of this development. To facilitate these developments to the Scottish system, the Robert Owen Centre for Educational Change (ROC) at the University of Glasgow was commissioned to design and support a research and development initiative that reflected this agenda. This initiative, entitled the *School Improvement Partnership Programme* (SIPP), employed an evidence-based approach to educational change; it placed collaboration at the core of its purpose. The enquiry model is informed by a body of international research that illustrates the value of school-to-school networking and cross-authority partnerships as key levers of innovation and system improvement (Chapman *et al.* 2016).

5.3 Based on recommendations from the Donaldson report (2010) and the OECD's 'Improving Schools in Scotland' (2015a), the Scottish Government has also funded and implemented a new *Research Strategy for Scottish Education* (RSSE; Scottish Government 2016) in 2017. Both the SIPP and RSSE employ a 'what works' approach to evidence-based engagement and practice.

The School Improvement Partnership Programme (SIPP)

5.4 The *School Improvement Partnership Programme* involves schools and local authorities working together to conduct collaborative action research that other practitioners can draw on to implement change in their own educational practice. The aim of the approach is to combine locally initiated and practitioner-led collaborative enquiry across classrooms, schools and local authority boundaries (Chapman *et al.* 2016: 15).

5.5 The model itself is underpinned by Collaborative Action Research (CAR), which aims to develop sustainable school networks. To support the CARs, the ROC research team works with practitioners, local government, *Education Scotland* and learning communities. The aim of this cross-institution approach is to empower practitioners by helping them use a range of research methods which generate knowledge and evidence to tackle educational inequity. The approach is grounded in international evidence and experience about improving outcomes for children and young people by changing teachers' practice and building leadership capacity through professional learning and collaboration (e.g. Chapman *et al*., 2016; Ainscow, 2015). By working collaboratively, practitioners also have the opportunity to share findings and work to bridge the gap between theory and practice.

5.6 The SIPP involves a process of collaborative inquiry that creates leadership opportunities and professional learning. Informed by key national policies, such as *Scotland's Curriculum for Excellence*, the Donaldson (2010) report, *SCEL Fellowship and Raising Attainment for All* (ROC 2015), the SIPP is designed around seven core principles:

- Partnerships across schools and local authorities
- Action research and evidence usage to inform key challenges, experiment with innovative practices and monitor developments
- Leadership opportunities
- Reciprocity and mutual benefit for all involved with regard to planning and implementation
- Planning for collaboration to build sustained capacity
- Strategic improvement planning in schools, local authorities, Education Scotland and other authorities.

5.7 These principles form the overarching framework of the programme and are used to implement a three-phase strategy. The first phase works to create trust and relationships between partners. The second phase seeks to integrate educational projects into relevant contexts, and the final phase focuses on sustainability and the strengthening of partnerships to create a SIPP network.

5.8 This resulted in eight discrete but interconnected projects. The implementation of these projects was supported by a team of university researchers, local authority and Education Scotland staff. The university research team also facilitated regular 'clinics' for practitioners and local authority staff to meet and solve problems, discuss concerns, challenges, methodological issues and ideas for development. Projects were also brought together at regular local and national events to allow for a sharing of ideas and practice. It is these events that Chapman *et al.* (2016: 19) cite as the catalyst for 'innovative and evidence-based practice being adapted and moving organically across partnerships without external support […] to come together as a whole'.

5.9 In their discussion and analysis of the SIPP, Chapman *et al.* (2016) discuss three primary areas of impact the programme has had on teaching in Scotland: building effective working relationships, understanding data and its use, and leadership development and leading learning. Overall, the evaluation found that the SIPP had a positive impact on these aspects of educational development (Chapman *et al.* 2016).

5.10 Progress and impact was most evident in those partnerships who were able to adapt and apply the core principles of the programme mentioned above, to the context(s) of their own schools and learners (Chapman *et al.* 2016). As a result of the success of the SIPP, Education Scotland established 'regional innovation hubs' (Network for Social and Educational Equity 2021). The Association of Directors of Education in Scotland called for the introduction of 'improvement hubs' across Scotland. In 2016, this led to two pilot regional collaboratives being established.

Regional Improvement Collaborations

5.11 As a result of the SIPP, six *Regional Improvement Collaboratives* (RICs) have been established across Scotland. RICs aim to 'bring local authorities together, alongside Education Scotland […] to facilitate collaborative working across the region, developing different ways of working together to build excellence and equity in the Scottish education system' (Scottish Parliament 2018). The purpose of the RICs follow the principles of SIPP and the *Network for Social and Educational Equity* strategy. The RICs are continuing to develop, with some projects, such as the West Dunbartonshire hub, involving nearly 250 educational practitioners and professionals (figure from 2018/19; see Scottish Government 2019 report). As well as helping to develop partnerships across different schools and educational institutions, RICs offer professional learning programmes that develop skills in effective collaboration with a particular focus on collaborative action enquiry. To do this, the RICs offer discussion forums, specialist subject networks and enquiry networks (see the West RIC for examples).

Evaluating Practitioner Engagement with Evidence

5.12 The 'Knowledge Utilisation Mapping Study' (Lowden *et al.* 2019) evaluated how effectively educational practitioners were engaging with principles of the SIPP, RICs and educational evidence/enquiry. It aimed to understand and identify what actions and system changes could help practitioners engage in research and more effectively use research to inform their practice in the future. Commissioned by the Scottish Government, the study had two main research questions:

- How do practitioners in Scotland engage in research and act on research evidence?

- What factors influence practitioners' ability to make the best use of evidence? (Lowden *et al.* 2019: 4).

5.13 The study categorised 'research evidence' into three main areas:

- School level data, often collected routinely to help understand pupil's attainment and achievement
- Accessing secondary research findings and knowledge such as books, and academic journals
- Conducting practitioner enquiry and action research, whether individually or collaboratively (Lowden *et al.* 2019: 4).

5.14 The research itself comprised three primary strands of enquiry: a literature review; interviews and focus groups with 67 informants who worked at various levels of the education system in six local authorities; and an online survey of 1036 practitioners across Scotland. The survey findings were used to further understand the qualitative data collected from the interviews and focus groups. The primary findings from the study are summarised below (see Table 1).

Table 1. Summary of key findings from the 'Knowledge Utilisation Mapping Study: Scottish Education System' (Lowden et al. 2019).

Key qualitative findings	**Key quantitative findings**
Research engagement was seen as central to teachers' professional identity.	Quantitative findings largely echoed key themes identified in the qualitative findings, particularly with regard to calls for dedicated time to engage with research evidence.
Evidence engagement is growing, but there is uneven capacity in the system regarding practitioner skills and engagement.	59% of participants indicated they were currently involved in one or more research-related activities.

The research evidence and data practitioners engage with most frequently is school-level data or online summaries of research findings which discuss pupil attainment and inform planning and pedagogical approaches in the school.	Almost four out of five respondents reported using data/research materials to inform teaching and learning.
Teachers are more likely out seek out and use knowledge when it can be seen to be readily applied to promote effective learning.	Two thirds of participants indicated its use in understanding the impact of teaching and learning.
Lack of time and space to engage with research was highlighted as the biggest barrier to practitioner development.	Taking part in structured collegiate discussions, career long professional learning courses/opportunities or working with colleagues in other schools/centres were cited as the most helpful supports in planning and developing practice.
Providing time and space for practitioners to meaningfully engage with professional dialogue regarding data, research and practice was seen as crucial.	A substantial number of participants thought they already had relevant research skills, but respondents also generally stated that they needed help with developing their analytical skills in relation to qualitative and quantitative data.
The current nature of teachers' workloads acts as a systematic inhibitor to increased research engagement.	Respondents indicated the need for: - Dedicated time to engage with research evidence (84%) - National advice and support on engaging with research evidence (79%) - Opportunities to work with colleagues on research activities (74%) - Partnerships with research specialists (74%).
Participants reported generally high levels of confidence in their skills regarding data and research use, but also reported requiring support to analyse and critically evaluate research evidence.	
Head teachers and school leaders see it as their responsibility to keep on top of knowledge on pedagogy and 'what works', meaning they are important translators of research knowledge and evidence.	

Limited examples of collaborative research projects within and across schools where practitioners focused on a particular challenge within the context of raising attainment were reported on. Instead, involvement in small-scale, collaborative interventions with associated enquiry to monitor impact helped build confidence and capacity of staff engagement with research were discussed.	
Resources and funding provided by the Attainment Scotland Fund helped foster a research culture.	

5.15 These findings illustrate important considerations for Wales. Time, space and resources to develop capacity for professional enquiry appear to be fundamental to the embedding and sustainability of this practice. Furthermore, this evidence suggests it is important to consider not only how practitioners will have access to the literature/research required, but also develop the skills required to analyse and evaluate this evidence. Most notably, perhaps, are the findings which illustrate practitioners' acknowledgment of the importance of collaboration and partnerships in developing professional evidence and enquiry capacity and skills.

The Research Strategy for Scottish Education

5.16 The *Research Strategy for Scottish Education* (RSSE) aimed to support the four priorities set out in the *National Improvement Framework* for education. In order to support the educational priorities, the RSSE identified three key focus areas:

- To support the research infrastructure and independent research
- To develop a knowledge base of 'what works'
- To empower practitioners to produce and use evidence and data.

5.17 To address these focus areas, the RSSE recommended that each level of the Scottish education system—from the Government to classroom practitioners—had a role to play in harnessing and implementing research evidence. It is this approach, combined with increased collaboration and communication across all actors within the education system, that the Government suggested would help to 'establish what evidence works in the Scottish context' (Scottish Government 2016: 3). That being said, despite extensive searches of the literature, it was difficult to ascertain the impact and/or influence of this policy on teacher research engagement and development.

Summary

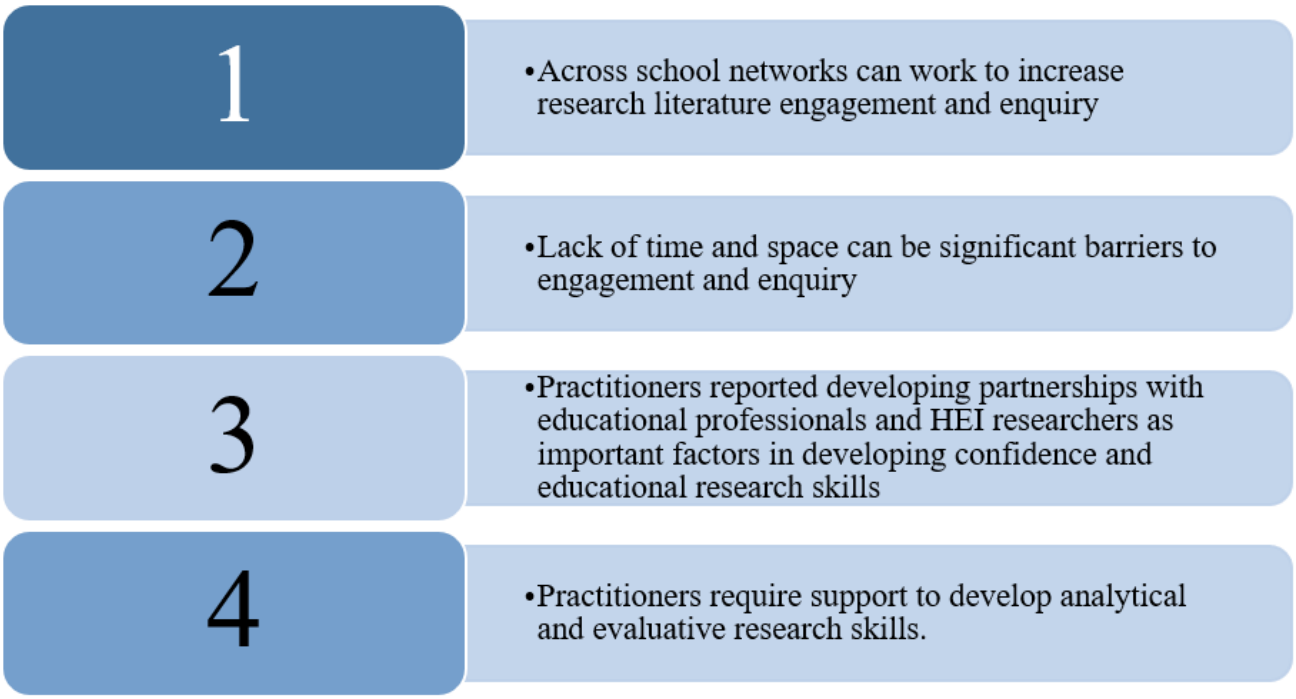


Figure 5. Key evidence take-aways from the Scotland case study.

6 Northern Ireland

6.1 As with the other nations in the UK, Northern Ireland's education system has undergone radical reforms over the last decade. However, as Leitch (2009: 355) explains, unlike other UK nations, recent conflict and political instability affect the infrastructure of Northern Irish systems. Northern Ireland had very few specific initiatives that aimed to enhance research capacity in teacher education, outside particular institutional support (Leitch 2009: 355). In their review; on the role and potential for 'research capacity building in initial teacher education', Gleeson *et al.* (2012: 26) suggest that at a minimum, developing this capacity means increasing numbers of 'methodologically sound and versatile educational researchers, including practitioners, with a vision and appetite for knowledge development and application of research to practice as well as the inclusion of insights from practical knowledge'.

6.2 They also suggest Gleeson *et al.* (2012: 26) that there is a need within Northern Ireland for education stakeholders to commit to an expanded version and understanding of research capacity-building based on a collaborative dialogue between existing and new practitioners, policy makers and the researcher community in education.

6.3 The Department of Education (DoE) in Northern Ireland also recognised this need to build educational research capacity and support practitioners in continuing to develop professional skills. In 2009, the 'Every school a good school' improvement policy was implemented (Northern Ireland Department of Education 2009). This policy acknowledges the need to develop high quality leadership and raise teaching and educational standards through collaborative networks in order to meet the complex and developing needs of pupils in a rapidly changing world.

The 'Learning Leaders' Strategy

6.4 As discussed above, the purpose of the 'Every school a good school' (Northern Ireland Department of Education 2009) policy was to develop educational standards across Northern Ireland. Additionally, this policy provided the foundations for other key educational development strategies, including the *Learning Leaders: A Strategy for Professional Learning* (Northern Ireland Department of Education 2016). According to the Minister of Education, this strategy built a vision for Northern Irish education up to the year 2020 'and beyond' (DoE 2016: 3).

6.5 The strategy identified key gaps in the Northern Irish education system, some of which included: embedded research-informed practice, collaborative working, context-based training and learning and career-long professional development. To address these 'gaps', the strategy takes a three stage approach:

- defining and developing - building capacity through collaborative practice;
- expanding - creating coherence;
- embedding - supporting a self-sustaining system of professional learning (DoE 2016: 27).

6.6 The strategy was evaluated by the Education and Training Inspectorate (ETI) one year into its initiation (see evaluation here). This evaluation found that one of the most notable impacts was practitioners' 'aspirations' to implement changes through developing professional practice (ETI 2016: 5). However, very few schools had managed to implement the strategy fully to see outcomes for their learners. That being said, evaluators reported observing a 'stronger emphasis on learning and teaching (pedagogy) in school-based professional learning' and an 'increased emphasis on a collegial and/or a collaborative approach to professional learning' (ETI 2016: 6).

Centre for Shared Education, Queen's University Belfast

6.7 The Centre for Shared Education (CSE) at Queen's University in Belfast has three main aims:

- To increase understanding of school-based sharing
- To develop and extend a model of shared education
- To foster expertise and support practitioners

6.8 Researchers from the CSE have had substantial engagement with government, at both local and international level, and have provided evidence for the Northern Ireland Assembly's Committee for the *Shared Education Bill* (Northern Ireland Assembly 2016). Additionally, the CSE works with the Education Authority (EA) to provide two teacher training modules for practitioners working in Northern Ireland schools. These modules are part of the EA's teacher professional learning programme, which aims to increase the effectiveness of shared education in the classroom. One of these modules, *Making Your Shared Education Partnership Work*, provides teachers with a practical guide to the potential of shared education for school improvement and promoting good relations within the school and the wider community. As well as these individual modules, the CSE also developed the *Shared Education Signature Project* (SESP), which focused on school improvement through the sharing of 'best practice' in collaborative school networks.

6.9 The *Shared Education Signature Project* (SESP) brings together schools and professionals from different sectors to work in partnership with one another. It provides pupils, staff and the community opportunities to engage in collaborative and meaningful learning experiences (Education Authority 2020). The project ran from 2014 – 2019 and findings from an evaluation conducted to understand practitioner involvement with the SESP suggests that the programme had positive outcomes for practitioners and learners alike (Gallagher *et al.* 2020).

6.10 The evaluation was conducted in two stages. Stage one involved interviews and focus groups with teachers and principals from six SESP partnerships and stage two involved an online survey of 134 principals and teachers to check whether the themes emerging from the qualitative work had a more general resonance (Gallagher *et al.* 2020). Overall, results suggest that teachers and principals identify a wide range of positive outcomes arising from collaboration through school partnerships supported by SESP. Furthermore, there was no evidence to suggest that SESP partnerships had created any 'blockage or constraint on the ability or capacity of schools to advance their core educational missions' (Gallagher *et al.* 2020: 42). Instead, practitioners reported teachers that collaboration had enhanced opportunities and outcomes for pupils, improved pupil learning and broadened curriculum choice. Collaboration is cited as improved practitioner capacity to share experience(s), access resources and expertise, and/or opportunities for professional development and learning.

6.11 One of the most notable outcomes of the evaluation was the unanimous view that both pupil and teacher confidence had been enhanced by participation in shared education (Gallagher *et al.* 2020). Practitioners reported that conversations regarding best practice through shared experience networks helped them feel more confident in finding, using and implementing evidence-based research. It is also important to note that the survey results showed little to no evidence in practitioners perceptions of the programme adding 'additional burdens' to their work or responsibilities from which no benefit derived (Gallagher *et al.* 2020: 41).

6.12 One area that emerged as a weaker element of the SESP was that the networks were helping to lead formalised changes in schools which would contribute to the institutionalisation of newly developed practices (Gallagher *et al.* 2020: 41). Some respondents did report more formal changes occurring, but this was in a minority of schools. However, of particular note was that 90% of survey participants said communication and thinking skills had improved, whilst three quarters said their research and dissemination literacy skills had improved (Gallagher *et al.* 2020: 4). As summarised in more detail below, these findings offer key considerations for the development of collaborative educational research and enquiry in Wales.

Summary

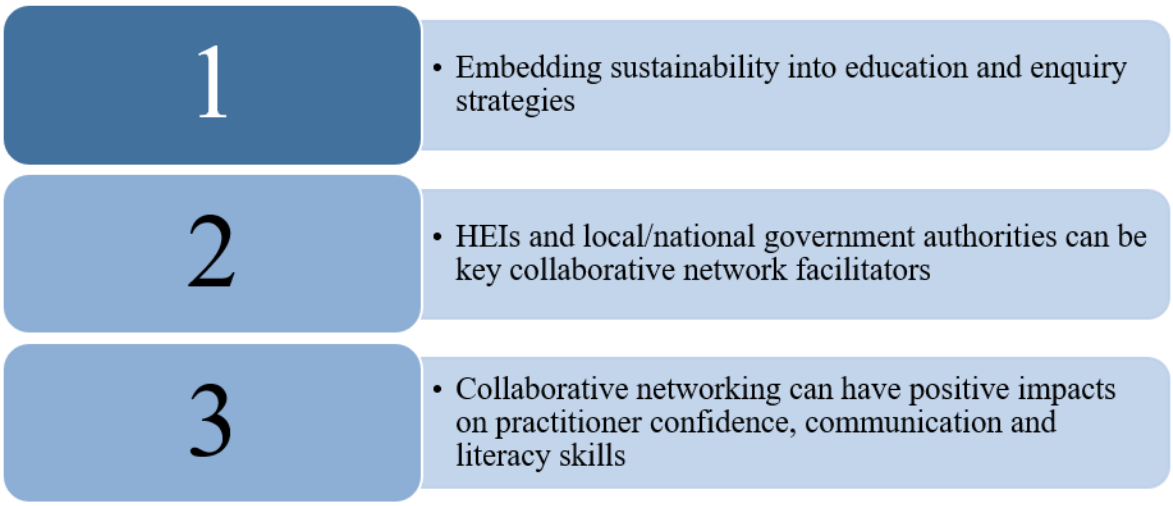


Figure 6. Key evidence take-aways from the Northern Ireland case study.

7 Finland

7.1 Since the mid-1970s, Finland has taken a research-based approach to educational practice (Sahlberg and Walker 2021: 3) including teacher education becoming grounded in the idea of teacher as a 'professional researcher' (Westbury *et al.* 2005). Many comparative international studies cite this teacher autonomy and research-based approach as the reason the Finnish education system is 'top-performing' (see OECD, 2013; 2015b; 2018).

The Role of Teacher Education

7.2 Teaching is one of the most highly competitive professions to enter in Finland, with 5% to 10% of all applicants selected for the elementary teacher programme and 20% to 40% (depending on the subject chosen) of all applicants selected for the secondary teacher programme (Finnish National Board of Education 2013). Not only are teaching training programmes highly competitive, they are also highly selective. According to Sahlberg and Walker (2021: 140), this is because Finnish teacher training is highly academic; it is always based on and supported by scientific knowledge and focuses on the thinking processes and cognitive skills needed to conduct and design educational research (Hammerness *et al.* 2017). Consequently, the basic requirement for permanent teaching positions in all Finnish comprehensive and upper-secondary schools is a research-based master's degree (see Table 2). In most cases, it takes between five and six years to qualify as a teacher in Finland (Sahlberg and Walker 2021: 141). Teacher education is based on the idea of the teacher as researcher; teachers are trained to reflect and analyse their work, think scientifically, examine their own world of values, and adjust their teaching continuously (Makinen and Annala 2010).

Table 2. Teaching levels and required teacher qualification levels in Finland, adapted from Sahlberg and Walker (2021).

Type of school	Age of Pupils	School Grades	Required Teacher Qualifications
Kindergarten	0-6		Kindergarten teacher (BA)
Preschool	6		Kindergarten teacher (BA) Primary school teacher (MA)
Comprehensive school	7-16	1-9	Comprehensive school teacher (MA)
Primary school	7-12	1-6	Primary school teacher (MA)
Lower-secondary school	13-15	7-9	Subject teacher (MA)
General upper-secondary school	16-18 10-12		Subject teacher (MA) Vocational teacher (BA) Subject teacher (MA)
Vocational upper-school secondary school			

7.3 Every student teacher must fulfil basic criteria in the amount and quality of academic content knowledge and pedagogical research-based studies they complete on their training programme. However, study programmes are not closed units. Students can design their own study plans according to types of formal qualification they want to achieve; for example, only elementary or secondary teacher qualifications or both (Niemi, 2015: 283). Furthermore, every student teacher must participate in research seminars and projects, learn different research methods that can be used in educational studies and write theses/research papers based on these findings. The leading principle has been that teachers need a thorough knowledge of the most recent and relevant research to make advances in the subject they teach.

7.4 According to Niemi and Nevgi (2014), the most important abilities teachers learn through research studies are, an embedded understanding of critical thinking, independent thinking, inquiring, scientific literacy, and questioning of knowledge. Finnish trainee teachers also learn how to design, conduct, and present original research on practical or theoretical aspects of education. Niemi (2015) argues that it is this flexibility of programme structure, focus on research-based knowledge enhancement and encouragement to complete multiple qualifications (which provides teachers with the right to seek entrance to doctoral level education) that helps Finland to develop critical, reflective and research-informed educational practitioners.

Collaborative teacher-researcher networks

7.5 To build these hubs and support collaboration and sharing of research-based practice, in 2015, the Finnish National Agency for Education (FNAE) launched a national school network scheme called *Majakka* (meaning 'Lighthouse'), which comprises six regional sub-networks and involves a bottom-up, school-led approach to development and innovation (Riina 2019; ET2020 Working Group Schools 2018; Vainikainen and Koivisto, 2018). Membership of the network, which was introduced to encourage peer-to-peer learning opportunities between schools, is voluntary and includes schools with nineteen varying developmental needs. In this scheme, local schools organise and offer professional development and learning opportunities to one another free of charge.

7.6 The National Agency for Education publishes good practice guides which synthesise research evidence for practitioners (for examples, see here). The *Majakka* scheme helps teachers employ and evaluate these models so that they can be adapted and used to suit varying school contexts. The scheme also offers peer observation opportunities for teachers from nearby schools and teacher experts in specific subjects or fields coach other schools through the sharing of planning materials, classroom activities and pedagogical findings (Riina, 2019: 49). The focus of the scheme is on 'effective use of local resources in order to respond to local needs' (Riina, 2019: 49). No funding is offered to the schools involved in the network; it relies on the willingness of network actors to support one another (ET2020 Working Group Schools, 2018: 367).

7.7 In each year of the University of Helsinki's teacher training programme, trainees are asked to explore a research question, design a research methodology, collect data and analyse, discuss and share the results and findings from the study. An example of a research project first year trainees were asked to undertake asked: 'How should a teacher get to know his or her students?' (Westbury *et al.* 2005). Trainees were expected to hold discussions with students and conduct formal interviews, as well as practice various observation techniques which provided them with 'comprehensive descriptions and understanding' (Westbury *et al.* 2005: 478). The aim of this project was to put in to practice the qualitative research methods, psychological theory and learning principles developed in other pieces of coursework trainees had already completed. This research question also ensured that each teacher was working with the values behind the curriculum (understanding individual learning needs) and questions around the purposes of education issues which required systematic analysis.

7.8 The idea behind these mini-research projects is they provide the 'necessary understanding for teachers' curriculum-making, assessment and evaluation' in the future (Westbury *et al.* 2005: 478). Furthermore, in the past, Finnish teacher training methods have been criticised for being 'unabridged' (see Kosunen & Mikkola, 2002); the theory was unconnected to the practice. By using more of these mini-research projects as part of the teacher training course, the University of Helsinki works to combine the theoretical foundations for teaching and subject studies that are taught in classrooms on university campuses to practice-oriented preparation in schools.

Summary

Figure 7. Key evidence take-aways from the Finland case study.

8 Estonia

8.1 In Estonia, schools have a large degree of autonomy. The state sets national standards and establishes principles of education funding, state supervision and quality assessment. Estonia also has one of the most equitable education systems in the European Union (EU), with the smallest impact of socio-economic background on students' performance (OECD 2020: 8). The results of this equitable system are evident in international test score results, as Estonia continues to outperform other countries in overall Programme for International Student Assessment (PISA) tests despite relatively low expenditure on education (OECD 2020: 1; PISA 2018). However, the Ministry of Education for Estonia has recognised that in order to ensure Estonia remains a consistently high-achieving country, it needs to develop and expand its capacity for educational research.

8.2 In 2012, the Estonian Ministry of Education and Ministry of Economic Affairs and Communications initiated the third reform of the *Estonian Research and Development and Innovation Strategy* (RDI; 2014 – 2020). The redeveloped strategy, now entitled *Knowledge-based Estonia*, was developed in partnership with more than 200 specialists, comprising Estonian researchers and entrepreneurs, as well as policy-makers and implementers. The goals for the strategy were decided upon based upon the need to plan for a 'rapidly changing world', and the need to develop a society which would support, in conjunction with other member states, the 'common goals of the European Union' (Republic of Estonia Ministry of Education 2014: 1). The policy was approved by the Estonian Government in 2014 and acts as an umbrella policy for various education and economic strategies including the *Lifelong Learning Strategy* (LLS).

The 'Lifelong Learning' strategy

8.3 The *Lifelong Learning Strategy* (LLS; 2020) has been implemented in Estonian schools since 2014. It has five strategic goals (outlined below) and aims to develop educational capacity across all levels of institution in Estonia. The development of the LLS saw a steering committee of 15 experts from different disciplinary backgrounds collaboratively identify areas for development and improvement in Estonia's education system. These areas for development were identified using evidence from analyses of the previous *Research and Development and Innovation Strategies* (see the LLS for more detail). For example, one key obstacle that the new LLS aimed to overcome was that previous research-based approaches to learning had been 'adopted only in theory' and, therefore, they had 'not become an integral part of the learning process' (LLS 2020: 6). Another major barrier identified to practitioner professional development was that teachers' access to the digital infrastructure and learning materials is limited and inconsistent (LLS 2020: 6). Furthermore, Estonia currently has an ageing teacher population—more than half of teachers in Estonia are aged 50 or above (OECD 2019a: 84)—which has caused concern about the sustainability and innovative capacity of educational research usage in the country. As such, the *Lifelong Learning Strategy* looks not only to enhance the skills of current education practitioners, but also prospective teachers as well as learners of all ages.

8.4 In light of these findings, the steering committee developed the following strategic goals:

- *Changes in the approach to learning*: Implementation of an approach to learning that supports each learner's individual and social development, the acquisition of learning skills, creativity and entrepreneurship at all levels and in all types of education.

- *Developing competent and motivated teachers and school leadership*: Including efforts to increase teachers' salaries and to make the profession more competitive. There were also measures to improve teacher and school leaders' professional development.

- *Alignment of lifelong learning opportunities with the needs of the labour market*: Including efforts to improve the use of labour market data to inform educational provision, improving the quality of career guidance, and promoting work-based learning in VET and higher education.

- *Placing a digital focus on lifelong learning*: Improving the digital skills of the population, for example, by upgrading the digital infrastructure of schools and higher education institutions and incorporating a digital culture into the learning process.

- *Ensuring equal opportunities and increased participation in lifelong learning*: For example, through measures to increase access to the Early Childhood Education and Care Ministry department and initiatives to improve the labour market participation of groups with lower competitiveness (LLS 2020).

8.5 To ensure that the LLS progressed and the strategic goals became fully embedded in practice, the Ministry of Education drew up an implementation plan that was renewed every year in line with the state budget strategy (OECD 2020: 21).

8.6 Initial analysis of the LLS suggest that it may have been successful in helping Estonian practitioners build educational research capacity into their relative institutions. The most recent OECD 'Teachers and School Leaders as Lifelong Learners' study shows that 90% or more of teachers engage in 'reading professional literature' (OECD 2019c: 158). Furthermore 100% of principals in Estonia reported that they had participated in at least one professional development activity in the previous 12 months and nine out of 10 teachers reported receiving support to undertake some form of professional development training (OECD 2019c: 153, 180). In order to sustain the development of practitioner 'competence' (LLS 2020: 10), the LLS identifies two centres that will lead the training: Tallinn University and the University of Tartu.

Tallinn University and the University of Tartu

8.7 The developers of the LLS decided that Tallinn University and the University of Tartu should be responsible for teacher education, educational research, and an educational research programme. The LLS provided the centres with clear aims, some of which included:

- Making school practice more efficient by integrating theoretical studies with practice;
- Collecting the best practices from around the world as well as the methodological knowhow in Estonia, to analyse it and disseminate examples of best practice to all Estonian educational institutions;
- Offering counselling to teachers on teaching specific subjects, vocational education and general didactics;
- Providing an environment for developing new and innovative solutions and contribute to their implementation;
- Carrying out educational research based on the priorities of the national educational strategy;
- Initiating and coordinating joint projects and research between universities and schools;

- Offering higher education courses on implementing the approach to learning. The development of these courses should be based on the respective research and development work, and take into account the needs and expectations of different learners (LLS 2020: 10).

8.8 The Centre of Excellence in Educational Innovation at Tallinn University is required to 'develop an interdisciplinary research field that focuses on innovative and evidence-based teacher education, school management and educational policy' (CIE website 2021). The Centre views educational innovation from a broader perspective by addressing the need to create a scientific base for the development of a new learning and teaching culture by ensuring it is firmly rooted in Estonian education.

8.9 The CIE has introducedf several key initiatives, one of which is the new induction year programme. This programme is designed for novice teachers of pre-school child care institutions, special education teachers, speech therapists, teachers of general education schools and vocational educational institutions, as well as for more experienced colleagues who require a 'professional update' (CIE 2021). The training is financed by the Ministry of Education and Research and is provided by both Tallinn University and the University of Tartu. The types of training offered are depicted in Table 3 (below).

Table 3. The role of CIE in supporting educational professional development, adapted from the CIE website.

Type of training	Purpose of training
Support programme for junior teachers	Training sessions/seminars for new teachers are held during school holidays. Participants analyse the experience gained during the first working year(s), discuss and analyse the problems they encountered and find solutions together or with the help of experts, if necessary.
Mentor training	The course is designed to clarify some aspects relating to the implementation of the induction year programme and to support the development of supervising skills.
Information exchange for mentors and junior teachers	Electronic lists of junior teachers and mentors facilitate the exchange of information and offer an opportunity to find solutions to the issues related to the implementation of the induction year programme.

Seminars	Seminars are held two to three to times a year for mentors who have received mentor training, management training or intern supervision training. Mentors are given an overview of the activities taking place in the given year, provided counselling and engaged in discussions about future activities.
Supervision of teachers who have participated in the induction year programme	Becoming a teacher is a lengthy process and therefore, junior teachers who have participated in the programme are given an opportunity to continue training in supervision groups.

8.10 In order to develop and support this training, the CIE conducts research activities in five primary areas (see Figure 8).

Figure 8. Areas of educational research activity and support at the CIE, Tallinn University.

The educational research activities shown in Figure 8 illustrate that the CIE is focused on supporting learner development, including increasing the evidence-based

innovation management capacity of an educational institution. The process centres on educational change, including the development of empowering and inclusive leadership by leaders, development of collaborative habits by teachers, and an evidence-led analysis of the process and impact of the change. The Centre believes that these five areas of research activity will 'promote increasingly evidence-based and purposeful development activities in schools by supporting a changing approach to teaching and learning in schools' (CIE 2021).

8.11 The University of Tartu's Institute of Education is responsible for educational research and teacher initial as well as teacher in-service training. There is a Network of Innovation Schools established by the umbrella unit for teacher education and research, *Pedagogicum*, at the University of Tartu. The *Pedagogicum* website is only available in Estonian so I was not able to fully explore this network. However, the network involves 56 schools of different type and size (from 60 to 3500 students), spread all over Estonia. According to information on the Institute of Education website, the goal of this network is to bridge the gap between theory and practice in a community where the schools and university are equal members and benefit from each other's strengths.

Summary

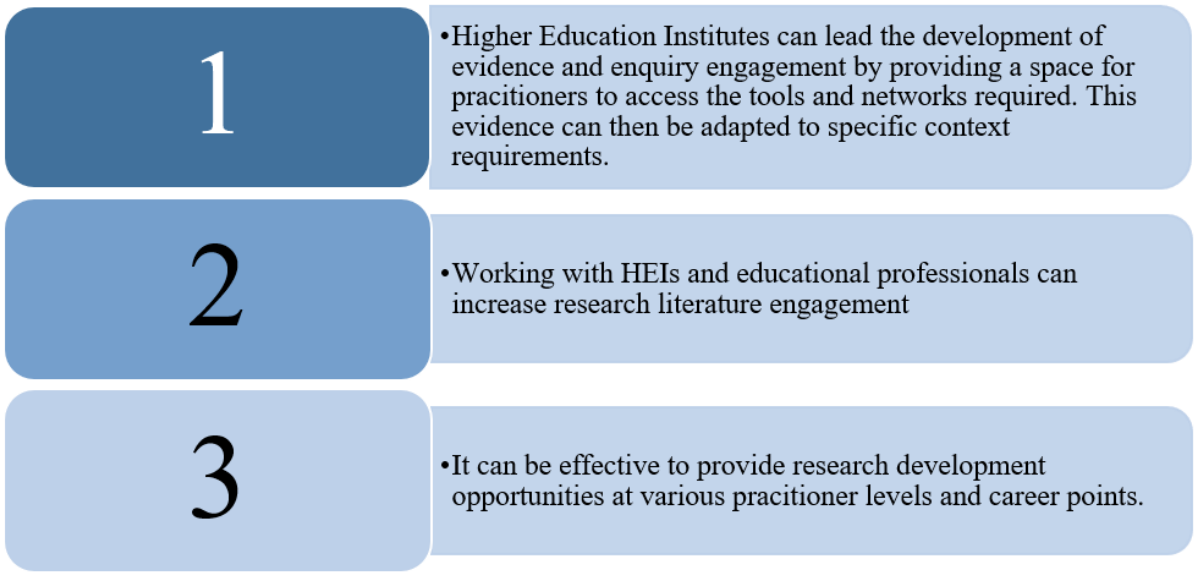


Figure 9. Key evidence take-aways from the Estonia case study.

9 Ontario, Canada

9.1 Ontario has been identified as the most proactive of Canada's provinces for the use of research to inform education practice (Sá and Hamlin 2015). Teacher professional associations offer support and networking opportunities for the sharing and dissemination of 'best practice' evidence-based professional enquiry.

9.2 In 2005, the Ontario Ministry of Education published the *Ontario Research and Evaluation Strategy* (ORES). As Figure 10 shows, the ORES is committed to 'developing and implementing policies, programmes, and practices that are evidence-based, research-informed, and connected to provincial education goals'. Having worked with a researcher-in-residence and a Chief Research Officer (Dr. Lorna Earl and Dr. Carol Campbell) from the outset of the strategy, in 2008, the Ministry created a *Research and Evaluation Strategy Branch* to support the work and implementation of the researchers and ORES (see ORES report for more information about the branch).

9.3 The primary goal of the ORES was to increase knowledge mobilisation efforts. As explained by Malik (2016: 10), 'knowledge mobilisation' is a term frequently used within Ontario to describe the 'active and dynamic process whereby stakeholders [e.g. researchers, practitioners, policy makers and community members] share, create and use research evidence to inform programming, policy, decision-making and practice'.

9.4 This notion of an all-inclusive educational profession approach (i.e. policymakers, support staff and inspectors as well as classroom teachers) is reflected in the Ministry's mission to develop and implement the strategy both internally and externally. The Ministry argues it is this dual approach that works to make 'research-informed policy and programme development and decision-making the norm' (KNAER 2017).

Figure 10. *Ontario Ministry of Education's Research and Evaluation Strategy diagram (2017).*

Collaborative networks

9.5 To facilitate this collaboration between internal and external parties, the ministry set-up the *Ontario Education Research Panel* (OERP), whose primary role was to facilitate discussion and collaboration among Ontario's school boards, faculties of education, researchers, professional organisations, community agencies, and ministries relating to:

- research priorities for Ontario education;
- the state of knowledge in specific areas;
- opportunities for and impediments to the advancements of research;
- and the potential for future partnerships.

9.6 Using a central, public webpage, (which has now been rebranded as *The Learning Exchange*), the OERP worked to connect researchers and educators to identify research priorities, share findings, and collaborate on connecting research to practice.

9.7 They also hosted the annual *Ontario Education Research Symposium,* which brought together approximately 350 teachers, district board staff, researchers and ministry officials to learn about research and evidence-informed effective practice. The last of these symposia took place in 2016 (see event here). However, following the success of these symposia, phase 1 of the *Knowledge Network for Applied Education* (KNAER) was established in 2010 through a tri-partite agreement between the University of Toronto, Western University and the Ontario Ministry of Education.

9.8 The aim of KNAER was to advance and apply robust evidence of effective research-informed educational practice through:

- promoting research use;
- synthesising state-of-the-art knowledge from existing bodies of evidence; and
- facilitating networks of policy makers, educators, and researchers to work collaboratively, to apply research to practice.

9.9 Phase 1 of KNAER funded 44 projects that focused on mobilising research-based evidence throughout the province. Table 4shows the types of organisation involved with these project partnerships.

Table 4. Knowledge Network for Applied Research (KNAER) collaborative organisation partnership breakdown.

Organisation type	Total number of participants
Community organisations	60
School boards	46
University partnerships	22
Health organisations	10
Colleges	8
Total number of partnerships	**146**
Total cost	**$4 million (CDN)**

9.10 In 2014, an analysis of the utility of KNAER led to the development of recommendations for continued progress. The key recommendation was that the KNAER continue to build on its successes and identified challenges, while evolving towards a systems approach to research-informed practice.

9.11 As such, from 2015-2020, the KNAER supported thematic knowledge networks which were used to enhance 'knowledge mobilisation' on four specific themes: Mathematics Knowledge Network; Knowledge Network for Student Well-being; Knowledge Equity Network; and the Indigenous Education Knowledge Network (KNAER, 2017). However, funding for all bar the Mathematics network has now ceased.

9.12 The Ministry of Education also began producing a research monograph series for teachers. Each series is organised by pedagogical theme and contains several eight-page articles which are freely available online, use illustrative graphs and infographics to report findings and make recommendations for teaching practice in 'reader-friendly' language (see example here).

Evaluating the Strategy

9.13 Malik (2016: 190) notes that 'measuring impact [of the research strategies] is an area that is identified as one that needs considerable attention and greater focus, learning, practice and action'. There is, however, a lack of evaluation evidence on the Ontario strategy. There is some evaluation of the impact of the first phase of the KNAER project (see evaluation here), however the primary analyses offered explore the academic impact of the projects.

9.14 For example, of the thirteen 'exploiting research' projects conducted, the analyses demonstrates that twelve projects were presented at conferences, one project completed a book chapter, and many projects published in peer-reviewed journals (Campbell *et al.,* 2014: 25). This could be because the impact of these networks is being fed directly back into the system and practitioners are using these strategies at ground level.

9.15 Discussions with stakeholders revealed , however, that all but the Mathematics KNAER had their funding cut in 2018. A change of Government meant that the focus became measuring the impact of evidence and enquiry practice on students, rather than developing the practical side of evidence and enquiry strategies further. This is not to say that this type of practice is not still used in the classroom. However, stakeholders explained that the impact of the Mathematics line of enquiry was evident, whereas the impact of the other networks was less clear and/or explicit. Consequently, articles or evaluation relating to impact of phase 2 of the KNAER project are not yet available.

9.16 There are, however, examples of research being used to develop other Ministry of Education initiatives. For example, the *Ontario Leadership Framework* is grounded in 'school system practices initially identified in several comprehensive reviews of research' (Leithwood 2012: 4). Furthermore, the *Teaching Learning and Leadership Programme* (TLLP) uses research evidence for professional development. The TLLP is grounded in in five key characteristics of effective professional learning, the fifth of which is the idea of being an evidence-informed practitioner.

9.17 In 2016, Campbell *et al.* conducted a mixed-methods study to evaluate a sample of the final reports produced by practitioners on the TLLP. They found that of the sample analysed (n = 33), the top three goals for the majority of projects was to develop and improve knowledge (79%), strategies (67%) and skills (48%). In order to achieve these goals, 48.6% of the project reports reported engaging in action research or using research methods to gather data and act on it were top practitioner priorities. It is because of this that Brown and Zhang (2016) and Roberts (2015) argue that a culture which encourages, supports and fosters research use is embedded in Ontario's approach to educational development.

Summary

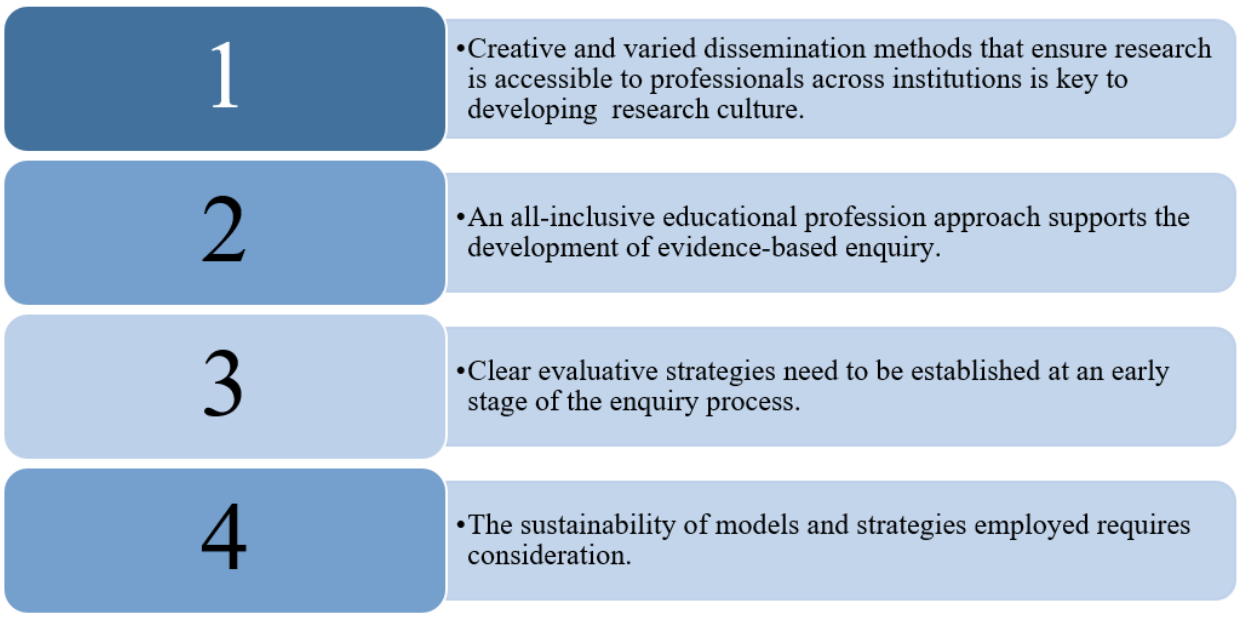


*Figure 11. Key evi*dence take-aways from the Ontario *case study.*

10 New Zealand

The 'Teaching as Inquiry' Cycle

10.1 In 2003, the Ministry of Education for New Zealand created the *Teaching as Inquiry* (TAI) framework which is a cyclical model that should be used by educational practitioners to 'learn from their practice and build greater knowledge' (Ministry of Education New Zealand 2003; see Figure 12).

10.2 This framework depicts four stages of inquiry: focusing inquiry, teaching inquiry, learning inquiry, teaching and learning inquiry. As discussed in further detail below, each stage has a slightly different purpose and each one leads on to the next (see Figure 12).

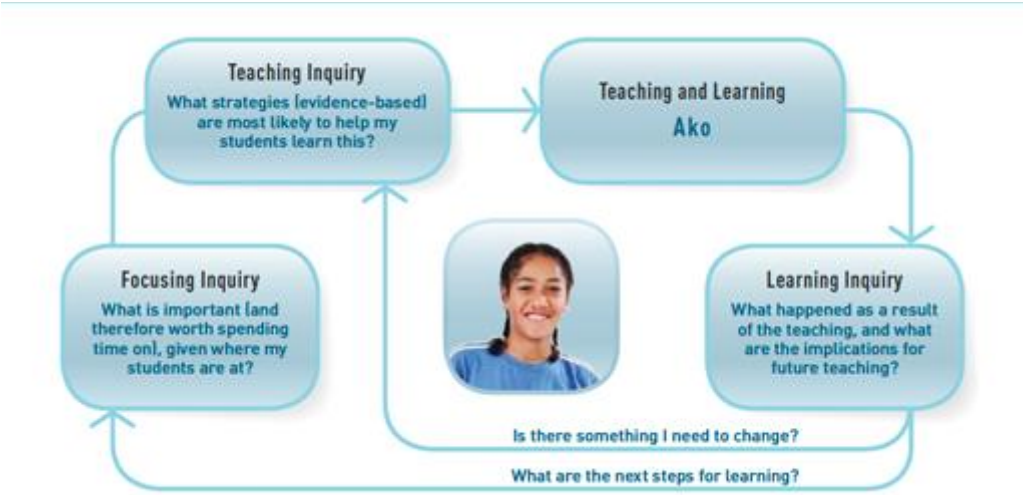


Figure 12. The Teaching as Inquiry cycle, Ministry of Education for New Zealand.

10.3 Each section of the framework is outlined as follows:

- Focusing inquiry - Teachers identify outcomes they want students to achieve. They consider how students are doing in relation to those outcomes, and ask what students need to learn next in order to achieve them.

- Teaching inquiry - Teachers select teaching strategies that support students to achieve identified outcomes. This involves asking questions about how well current strategies are working and whether others might be more successful.

- Teaching and learning – Teachers put the new strategies into action.
- Learning inquiry - Teachers monitor students' progress towards the identified outcomes and reflect on what this tells them. Teachers use this new information to decide what to do next to ensure continued improvement in

student achievement and in their own practice (Ministry of Education New Zealand 2003).

10.4 This inquiry cycle has become embedded within the New Zealand Curriculum (see Ministry of Education New Zealand 2015a: 34–35; and, Ministry of Education New Zealand 2015b: 13–16) and has been used as a starting point for other 'teacher as inquirer' initiatives. Examples of these initiatives are discussed in chronological order in the next sections of this report.

The Teaching and Learning Research Initiative (TLRI)

10.5 The *Teaching and Learning Research Initiative* (TLRI) was a government-funded initiative, introduced to practitioners in New Zealand in 2003. The aims of the TLRI were threefold:

- to build to a cumulative body of knowledge that links teaching to learning;
- to enhance links between research and practice across the early childhood, school, and tertiary sectors;
- and to grow research capability and capacity in the areas of teaching and learning (Hipkins *et al.* 2017: 15).

10.6 The intention was that these aims would be addressed via carefully constructed research projects, awarded in small numbers each year after a highly competitive round of bidding. Schools applied to the TLRI programme to be matched to academic researchers, a variety of educational professionals who worked outside the school system (i.e. Educational Psychologists), and project leaders. By early 2016, 125 TLRI projects had been funded.

10.7 In order to explore the impact of the TLRI programme, Hipkins *et al.* (2017) conducted an exploratory investigation. The researchers hypothesised that the main impacts would be an increased knowledge about a specific type of teaching challenge (Hipkins *et al.* 2017: ix). However, what actually emerged from the evaluation was that practitioner-based development was one of the primary impacts of the TLRI. Hipkins *et al.* (2017: ix) report that multiple teachers explained, 'I have totally changed how I am as a teacher', and participants continued by describing the direct links between their training and involvement with the TLRI and the development to their practice.

10.8 Table 5 highlights some of the key qualitative and quantitative findings from the surveys and interviews conducted with practitioners and professionals involved in the TLRI.

Table 5. Summary of results from Hipkins et al.'s (2017) TLRI impact investigation.

Findings from the quantitative survey (complete by 45 participants)	Findings from interviews with professionals involved with the TLRI
93% of the 45 survey respondents saw the development of strong researcher-practitioner relationships as key to success.	School leaders felt a shift in how they saw their job roles; they became direct avenues for dissemination.
The most significant reported impact was on the impact of the TLRI for learner outcomes. 73% reported strong impact for learners; 24% said some impact; 3% not sure.	Teachers reported new leadership/career opportunities opening up
80% of participants reported the TLRI having a strong impact on new or changed teaching and learning practices in the target area (short term); 15% some impact.	Teachers valued researchers holding up a 'critical mirror' which allowed them to reflect on what they do and why they do it.
71% of participants reported a strong impact on the development of research skills in the TLRI school team; 22% reported some impact.	Many experiences recounted by participants illustrated the powerful impact of changing awareness. This related to matters including context and culture; students' needs and challenges; teachers' needs and challenges; self-efficacy for teaching; ethical considerations; and/or the epistemology of a discipline area.
60% of participants reported a strong impact on the development of new or changed teaching and learning practices in the teaching area (long term); 29% reported some impact; 9% not sure.	New practices were directly linked to affecting approaches to teaching and learning.
The lowest impacts of the TLRI were reported in relation to whānau engagement (Maori language word for extended family) and Maori communities. Survey data showed 16% of participants were not sure of the impact for whānau; 11% reported no impact; 20% little impact; 33% some impact; and only 20% reported a strong impact. These figures were very similar for the impact on Maori communities as a whole.	Involvement in a TLRI can open new opportunities, with an associated expansion of opportunities for sharing impacts via a wider network. Examples in just these five projects included moving from teaching to a role in teacher education, moving into a new faculty leadership role, and taking on new responsibilities in a teacher education programme.

10.9 The data above suggests that researcher-practitioner relationships are important in supporting practitioners to develop evidence and enquiry-based skills. Furthermore, findings from this report suggest that practitioners feel this evidence and enquiry-based approach to teaching and learning does influence learner outcomes. Data also shows that the TLRI had a strong or some impact on school leader roles and career progression opportunities for practitioners working at different levels throughout the education system.

10.10 However, this data also highlights the need to provide practitioners with the time and support required to embed new practices into their teaching in the long-term as well as the short-term. Whilst 92% of participants reported that the TLRI had long-term some or strong impact on their practice, the short-term impact was slightly higher (95%).

10.11 In addition to the above findings, practitioners involved with the TRLI also reported the on how the programme had influenced them in terms of their own personal development as a practitioner. Firstly, data showed that 89% of the 45 participants felt that the TLRI programme had a strong or some impact on their methodology and research design skills; this was the development area with the highest impact. Additionally, 83% of participants reported the TLRI having a strong or some impact on establishing researcher/practitioner partnerships and 71% reported increased ability to use one or more tools of data analysis.

10.12 Overall, a positive impact was reported for each of the following TRLI development areas: creating new research tools; dissemination; face-to-face communication; writing to an audience; writing a clear report and diversifying avenues for dissemination. However, low impact was recorded on the development of practitioner literacy skills/literature searching, ethical thinking, and writing a convincing proposal.

Teacher-led Innovation Fund

10.13 As well as funding for specific initiatives, the New Zealand Government also supports and funds independent not-for-profit educational research organisations such as the *New Zealand Council for Education Research* (NZCER). Established in 1934, NZCER is Aotearoa/New Zealand's independent research and development organisation, operating under its own legislation since 1945. The NZCER Act 1972 provides a mandate to carry out and disseminate education research, and provide independent information, advice, and assistance.

10.14 The NZCER works to develop educational practices across New Zealand and uses the principles of the Treaty of Waitangi to work with and include Māori communities in their work. It has around 50 staff, a team of researchers and statisticians, a kaupapa Māori research team—Te Wāhanga, its own publishing site, NZCER Press, Psychological Test Services (PTS), which sell and distributes education, psychological and human resources tests, expertise in curriculum and assessment design and an educational library (NZCER website 2021).

10.15 A primary focus of NZCER's work, is to connect practitioners to the experts with the aim of supporting professional development. One such initiative that aimed to employ these tools and support was the NZCER's *Teacher-led Innovation Fund* (TLIF) inquiry programme.

10.16 This was carried out by the NZCER on behalf of the Ministry of Education. The purpose of the TLIF was to provide funding for groups of teachers to develop innovative practice in order to improve learning outcomes, particularly for Māori students, Pasifika students, those with special education needs and those from low socioeconomic backgrounds (NZCER website 2021).The TLIF supported practitioners to work with external experts, engage with the community, use an evidence base to inform implementation, and sustain inquiry within a team.

10.17 An evaluation of TLIF (McDowell,2016) interviewed TLIF monitors (those who led the programme in each school) about the effectiveness of these aims. Interview findings show that TLIF monitors observed that when teachers drew on external expertise they followed clearer and more robust inquiry processes, which resulted in positive learner outcomes; experts provided an outside perspective and skills or knowledge teachers did not necessarily have (McDowell 2016: 4).

10.18 Interviewees also observed that different teams needed different amounts, and different types of external support. The one area of expertise that monitors observed nearly all teams benefited from was expertise in inquiry (McDowell 2016: 5). Findings show that whilst teachers appreciated support within specific topic areas (e.g. children's writing development), they mainly required support with research/inquiry skills, such as refining research questions and determining evaluative measures etc. (McDowell 2016: 5). Furthermore, all monitors emphasised the need and importance for the inquiries to remain teacher led and owned.

10.19 Analysis of inquiry proposals suggested that some were designed and written by the experts, rather than the teachers. These proposals tended to be closely aligned with the expert's own research agenda, rather than the school, learner or practitioners' needs. Some monitors reported that when the inquiry question and design had been developed by the experts, teachers were 'less invested in the project and struggled to write milestone reports because they did not own (or even fully understand) the inquiry as designed or shaped by the expert' (McDowell 2016: 6).

10.20 This highlights the importance for practitioner research literacy development, of the focus being on the practitioners, their learners and their schools/local contexts. Furthermore, monitors considered shared ownership by all team members to be essential to the effectiveness of the inquiries as these projects maintained more momentum than those in which only the leader(s) understood the aims and importance of the inquiry (McDowell 2016: 6).

10.21 Overall, these teams also had clearly defined roles which monitors believed made individual practitioners 'better-equipped' to make required adaptations if challenges arose during the implementation of the inquiry.

Communities of Learning

10.22 In 2014, the New Zealand Ministry of Education implemented a new *Communities of Learning* (COL) initiative, which formed part of the government's $359 million scheme, *Investing in Educational Success* (IES). Closely linked to the *Professional Learning and Development programme.*

10.23 The aim of the IES was to raise educational achievement by lifting the quality of leadership and teaching so that evidence-based best practice became embedded in teaching. The purpose of each COL, therefore, was to raise student achievement by improving teaching and leadership through collaborative enquiry, provide opportunities for collaborative enquiry and knowledge sharing to take place, and extend career pathways for teachers (Ministry of Education: 2016: 3).

10.24 There are three primary roles within each COL: Community leader, across-community of learning teacher, and within-school teacher (Ministry of Education New Zealand 2016: 3). These roles work across and within the school community to support and share effective teaching and leadership practice.

10.25 Although these are the primary roles in a COL, practitioners from all levels of the New Zealand COL schools are expected to engage with evidence and inquiry (see example of Learning Support Delivery Model here). Inquiry time is provided to all schools in a COL and provides opportunities for teachers to work together to build a strong culture of inquiry and collaboration. Every school in a COL receives at least 0.05 full time teacher equivalent (FTTE) inquiry time per year. Where a school's guaranteed minimum formula staffing or assured staffing is greater than 10 FTTE, the inquiry time is calculated by dividing the school's staffing by 10 and multiplying that result by 0.06 to give an annual FTTE allocation (for additional information about the time and funding allocations for COLs, see the Ministry information site here).

10.26 In 2016, the Ministry agreed to additional support initiatives to improve progress and support COL members to work together effectively. This expansion saw the inclusion of 'Expert Partners', independent critical 'friends' who strengthen inquiry-based teaching practices (including evidence gathering, problem definition and evidence-informed action planning), and 'Bundled Support Packages', which include support from other Ministry service providers, such as IT, Finance, and property (Ministry of Education New Zealand 2016: 10). The board of each school or kura (Māori language immersion schools) receive $1000 when it joins a COL (Ministry of Education New Zealand 2016: 11). Each board then receives $1000 annually thereafter to help with costs relating to maintaining their COL. Since 2014, this initiative has continued to grow. As of January 2021, there were 220 Communities of Learning spread throughout New Zealand, comprising 1868 schools, 1551 early learning services and 11 tertiary providers which serve over 700,000 of New Zealand's children and young people (Ministry of Education New Zealand website). This report continues by exploring of COLs are formed and the known outcomes and impact of this initiative.

10.27 The process of forming a Community of Learning starts with a school or group of schools submitting an expression of interest application to the Ministry. A Ministry advisor then supports the network to formulate an eligible COL which reflects the whole learning pathway (from early learning to post-secondary education). The Minister of Education approves the COL on the Ministry's advice. After formation is approved, a COL leader is appointed. COL members then develop a shared achievement challenge and plan, working with their wider community, families and whānau.

10.28 The achievement challenges are identified across the school/institution networks by analysing shared data about local educational outcomes. An impact report (Ministry of Education New Zealand 2016: 4) illustrates that despite the vastness and variety of geographical locations and community contexts, COLs generally identify improving student achievement, collaborative profession inquiry and improving teacher practice as the primary COL goals. COLs then submit their achievement challenges and action plan to the Ministry's regional Director of Education. Once the Minister of Education agrees the achievement challenges, communities finalise a detailed plan and implementation starts. The COL monitors and reports progress, adjusting the plan and implementation strategy as necessary.

10.29 In order to assess the overall effectiveness of the COL programme, the Ministry of Education conducted an impact study which looked to measure the benefits and challenges of the initiative (Ministry of Education 2017). The study was conducted in 2016 and despite the continued growth of the programme, is still the most recent evaluation of the initiative.

10.30 Figure 13 shows key findings from the Ministry's impact investigation.

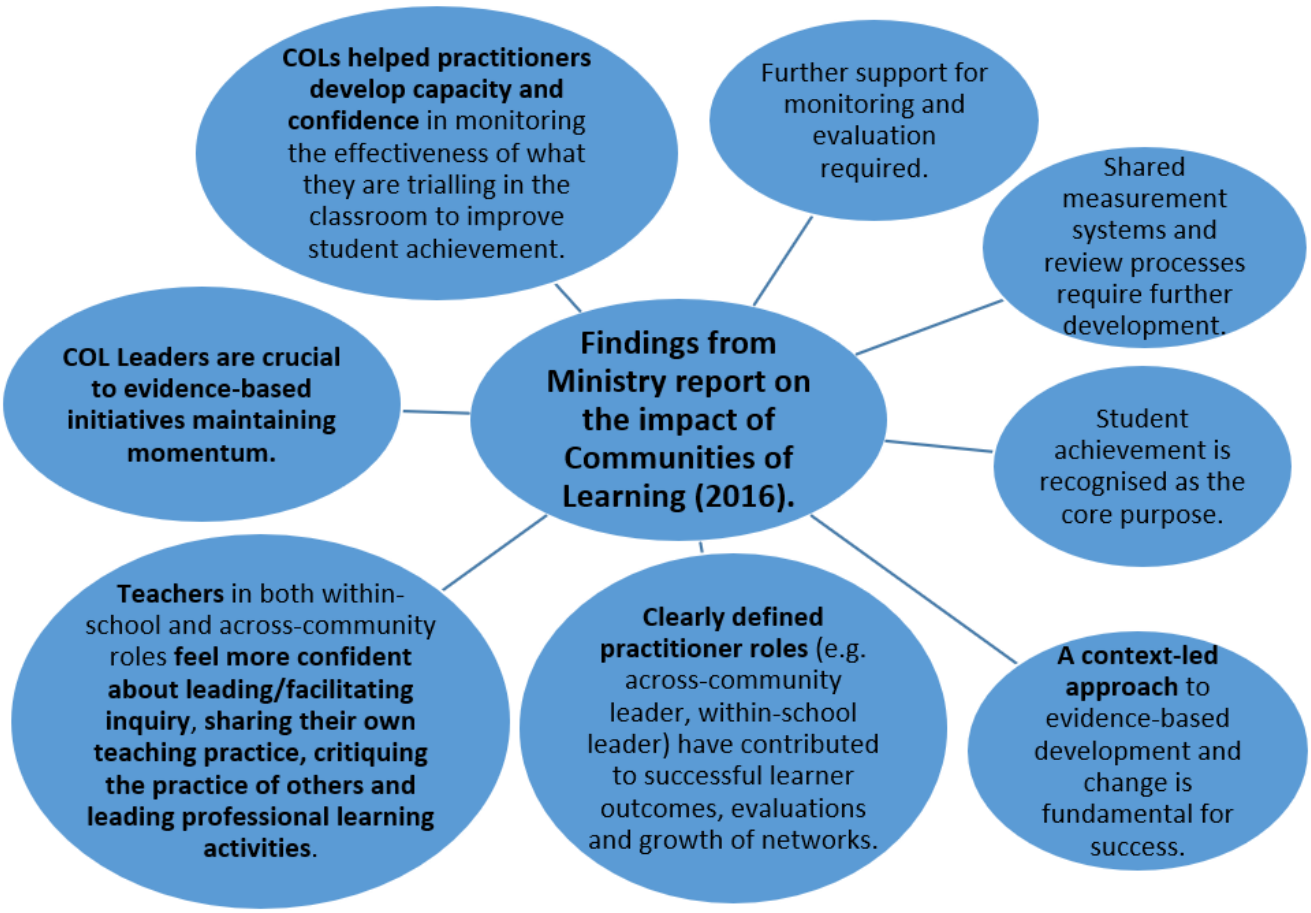


Figure 13. Findings from [Ministry of Education for New Zealand report on the impact of Communities of Learning (2017).]

Summary

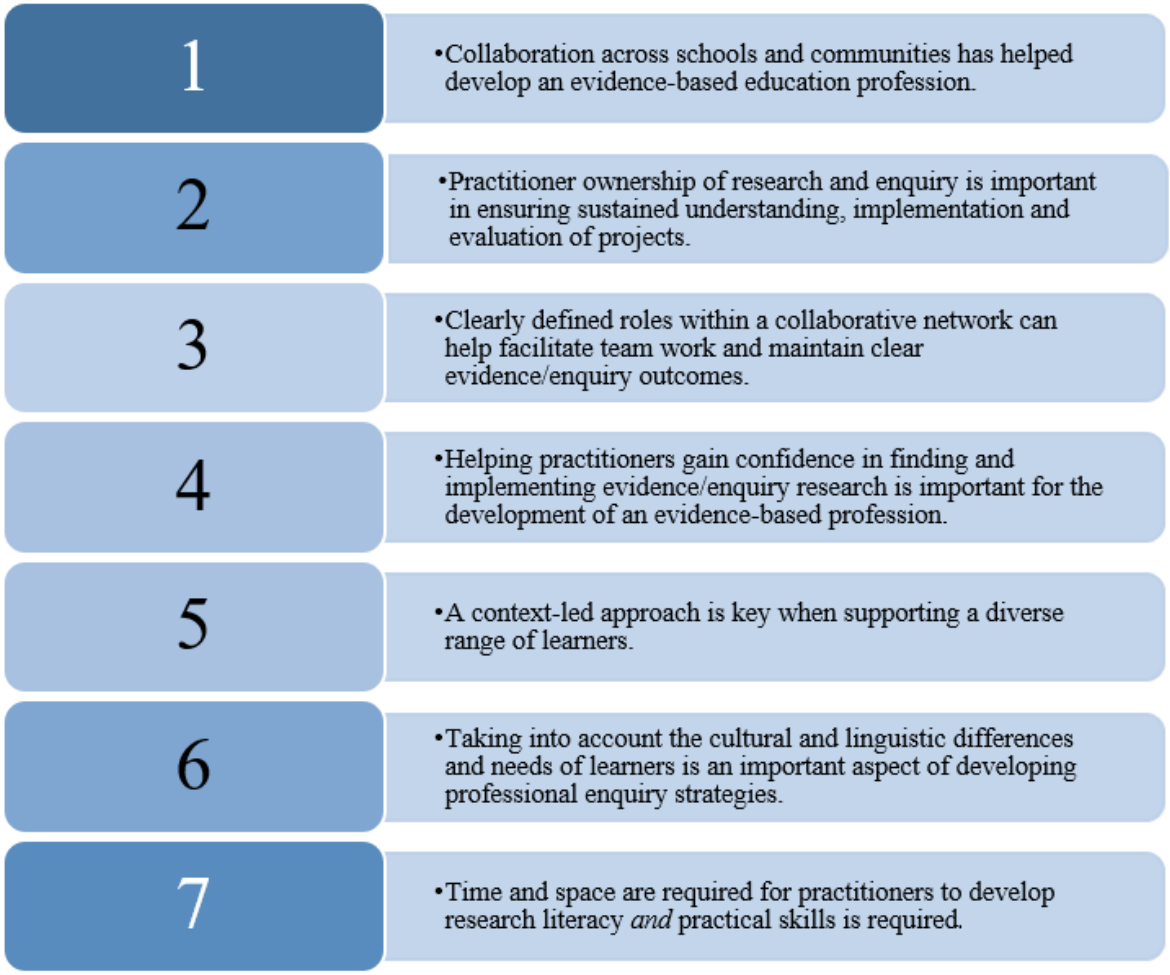


Figure 14. Key evidence take-aways from the New Zealand case study.

11 Singapore

11.1 Over the last decade, Singapore's education system has undergone major reforms. It is a highly centralised system: the Ministry of Education sets the national goals, curriculum guidelines and national examinations, sets guidelines for teacher development, evaluation and promotion, and hires most education officers (National Centre on Education and Economy (NCEE) 2018).

11.2 However, in recent years, there has been a move to give schools more autonomy over school curricula and teaching materials, so that practitioners can adapt their teaching to the local/contextual needs of their learners. To achieve this, schools are grouped into geographical clusters to allow for collaborative working on the Ministry of Education's education initiatives and sharing of best practice. The Ministry makes recommendations for which teaching materials should be used, but these clusters have the autonomy to determine how the curriculum will be implemented. The cluster superintendents, who are successful former principals, are responsible for providing leadership to principals, and to facilitate the sharing of resources and best practices between cluster schools (NCEE 2018).

11.3 The approaches taken in Singapore have transformed the education system from a developing one, to a system consistently at or near the top of most major world education ranking systems (i.e. top in the world in the Trends in Mathematics and Science study (TIMSS) in 2019; second in literacy in the 2016 Progress in International Reading Literacy Study; one of the top performing countries in PISA 2018).

Teacher Training

11.4 Teacher education in Singapore is provided by a single institution, the National Institute of Education (NIE), an autonomous institute of the Nanyang Technological University. However, the NIE works very closely with the Ministry of Education, the Academy of Singapore Teachers (AST) and schools to ensure teaching training and practice is closely aligned with ministry policies. To achieve this, the NIE continuously feed data and research, conducted for and by their trainees, to the Ministry so that it can be used to inform policy development. NIE Professors are regularly involved with Ministry discussions and decisions, meaning that educational research and development work on a continuous cycle (OECD 2011: 166).

11.5 This cycle begins, however, with rigorous and highly competitive teacher training programmes at the NIE. Singaporean teacher education includes academic subjects, education studies, curriculum studies, service learning and a significant amount of contact teaching time. Training in the academic subjects cover knowledge of the content and fundamental concepts and principles of either one or two subjects, depending on the programme in which the student teacher is enrolled (NCEE 2018). Candidates are supported by school mentors and university supervisors. A key objective of the contact teaching time is to help candidates link theory and practice.

11.6 To develop this link between theory and practice, recently, teacher training pedagogy has changed from being learner-centred (trainees attending lectures etc.) to self-directed (AST 2021). This has caused a shift in education practice philosophy in Singapore (see Figure 15); ownership of learning has moved from teacher trainers to teacher learners.

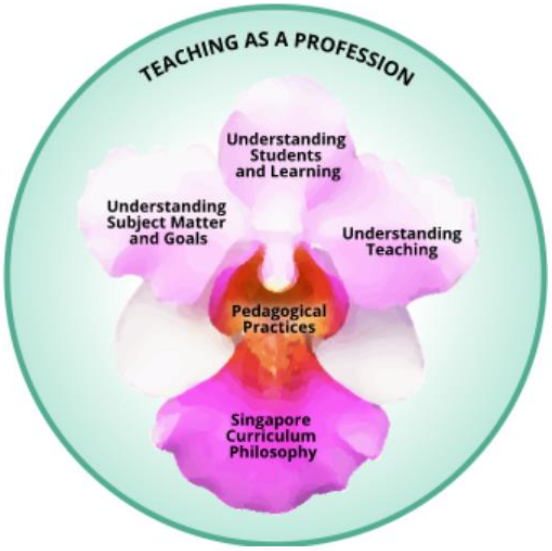


Figure 15. Singapore Teaching Practice model: Teaching as a Profession (Academy of Singapore Teachers website 2021).

11.7 A case study review on Singapore by the OECD argues this shift in ownership has strengthened the link between theory and practice in several ways (OECD 2017: 47). Teacher candidates are increasingly being asked to engage in more classroom-based inquiry and reflection. To support classroom inquiry, the government funded a long-term Centre for Research in Pedagogy in Practice (CRPP) at the NIE. The purpose of this centre is to examine current teaching practices in Singapore classrooms beyond the training years, by piloting new approaches and feeding back necessary policy/recommendation changes to the Ministry. This centre, combined with changes to Singapore's education philosophy, is one reason the OECD attribute a smaller gap between policy, classroom delivery and the curriculum in Singapore than other countries (OECD 2017: 47).

The Centre for Teaching and Learning Excellence

11.8 In 2015, the Centre for Teaching and Learning Excellence (CTLE) was established in the Yusof Ishak Secondary School (YISS). The YISS CTLE is a tripartite collaboration between YISS, the Academy of Singapore Teachers (AST) and the National Institute of Education (NIE). The YISS CTLE is used as a basis from which to offer inquiry-based training for secondary school practitioners across Singapore. Following the success of the YISS partnership, a new Centre for Teaching and Learning Excellence is to be established at New Town Primary School (NTPS) in 2021. The NTPS CTLE aims to directly benefit teachers across all primary schools in Singapore.

11.9 These partnerships bring together individuals with different professional expertise to offer a range of professional development programmes specifically designed to improve student outcomes by enhancing teacher competencies that focus on strengthening the research-theory-practice nexus, including experimentation with research-based curricular innovations (CTLE 2021). Teachers who attend professional development training with the CTLE observe seminars and/or webinars, and research-informed pedagogy implemented in classroom setting through master and demonstration classes. The network of master teachers (MTT), Professors and experts (who are all associated with AST, NIE and/or the Ministry) co-teach with teachers from the YISS to conduct 'in-situ' professional development (CTLE 2021).

11.10 In the most recent OECD 'Teachers and School Leaders as Lifelong Learners' (OECD 2019c) report, researchers proposed that a school-embedded approach to CPD activities could develop the depth of evidence-based knowledge practitioners require to sustain professional development. Researchers such as Borko (2004) and Opfer (2016) argue that school-embedded professional development is able to incorporate the teaching experience, the school context and teachers' collegiality to improve teachers' instruction (OECD 2019c: 158).

11.11 As such, the OECD (2019c) recommend that CPD training is more likely to affect teaching practices if teachers can relate the content of their training to their everyday work in their schools and classrooms. As well as Singapore, this model of in-situ professional training has been tested in Brazil and South Africa (see Bruns *et al.* 2018 for Brazil example and Cilliers *et al.* 2019 for South Africa example). Furthermore, since school-embedded professional development relies on capacities and know-how within schools (e.g. school climate, networking, quality relationships), it can be a cost-efficient way to support teachers and principals (Kraft, Blazar and Hogan, 2018).

11.12 The range of professional development opportunities at the CTLE go beyond the teaching strategies of academic subjects to also include strategies for developing students' socio-emotional competencies, character and values. The aim of helping teachers use research to develop these aspects of child development is to build 'all-rounded', 'life-long learning' citizens.

11.13 According to their mission statement, the CTLE aims to be 'at the forefront of exploring effective pedagogies set against authentic learning conditions, and contributing to the professional growth of teachers in the fraternity' (CTLE 2021). To support this exploration of pedagogies, and in addition to the in-situ training, the CTLE has two primary networks: *Professional Learning Communities* and the *Brown Bag Series*.

Professional Learning Communities

11.14 The main aim of the PLCs is to help teachers build critical inquiry skills by networking with researchers and practitioners within relevant fields. PLCs are expected to use the, '3 Big Ideas, 4 Critical Questions and 5 Dimensions for Effective PLCs' guidelines as a basis from which to build inquiry capacity. The three 'big ideas' of the guidelines are: ensuring students learn; building a culture of collaboration; and focusing on student outcomes. Within each of these 'big ideas' are a series of questions or dimensions. In the first stage, 'ensuring students learn', practitioners must ask and address four critical questions to plan and conduct inquiry. The questions and aims of asking these questions are:

- *What is it we expect students to learn?*

- *How will we know when they have learned it?* With knowledge of what students are expected to learn, PLC members discuss various strategies they can employ to obtain feedback on students' learning. Evidence is also used to appropriately evaluate the effectiveness of teaching strategies.

- *How will we respond when they don't learn?* This question allows PLC members to explore various interventions beyond the traditional practice of re-teaching or

remediation. Teachers identify root causes that may have hindered student learning and led to common misconceptions through evidence collected.

- *How will we respond when they already know it?* Similar to Question 3, this question aims to help PLC members identify methods to stretch students who have already mastered the concept (CTLE 2021).

11.15 To interpret and respond to these questions, each PLC school participates in an ongoing process of identifying the current stage of student achievement and establishing SMART targets which require the use of evidence to develop practice and outcomes. PLCs work together to try and achieve these goals by collecting evidence of progress through data collection and analysis of student results.

11.16 Currently, the Singaporean approach to evidence usage and data collection appears to be fairly grade-oriented. However, as discussed above, there is a more recent move towards incorporating evidence and collecting data regarding social aspects of student development as well. To help teachers develop the skills required to conduct inquiry-based practice and data collection/analysis, the AST designs and organises a series of courses to equip teachers with the knowledge and skills in conducting critical inquiry for their professional development.

11.17 The AST provides guidance on how to make use of various critical inquiry methods to systematically investigate their instructional practices. Despite thorough searches of the literature, it has been difficult to establish exactly what these inquiry methods in Singapore look like. However, the literature that is available makes clear that the purpose of this inquiry training is to help practitioners 'reflect upon and refine classroom practices collaboratively, to continually improve student learning' (CLTE 2021).

The 'Brown Bag' Series

11.18 As part of the CTLE's aim to develop teachers who are reflective practitioners, the Academy of Singapore Teachers (AST) promotes research literacy and critical inquiry in professional development among teachers. One method used to do this is the *Brown Bag Series* (BBS), which is an educational research-based seminar series. As explained on the website (referenced above), the aim of the BBS is to 'help teachers sharpen their critique' of research information which they may read in their reflective practice or want to use to enhance student learning. The BBS invites speakers to each session and past speakers have included NIE researchers, Ministry senior specialists and teacher-researchers.

Professional Development

11.19 The Ministry of Education has recognised that for teachers to respond to continually improve practice and respond to the ever-changing needs of their learners, teachers need time and space to participate in professional development (Singapore Ministry of Education website 2021). As such, Singaporean practitioners are entitled to 100 hours of professional development time per year. This 100 hours can be completed in several ways:

- undertaking additional subject or pedagogical-based courses at the NIE;
- school-based training (usually led by school development officers) which helps teachers examine teaching-based problems within the school; and/or
- project-based learning which focuses on a specific subject area within the school.

11.20 To complete the 100 hours of training, each school has a fund (provided by the Ministry) to use on supporting teacher development. The teacher networks and PLCs (discussed above) encourage peer-to-peer learning and the AST also acts as a base from which teachers can share findings of evidence and best practice. What sets the Singaporean approach to education research apart from others discussed in this report, is the funding, support and encouragement for teachers to travel abroad to develop fresh perspectives and collect international evidence of best practice which could be adapted to suit the context of the Singaporean education system.

Integrating Research Into Practice

11.21 The Ministry funding provided to schools has allowed practitioners in Singapore to make extensive use of international evidence and benchmarking as a tool for educational improvement and the testing of evidence/inquiry-strategies in the classroom. Typically, the international visits and research focus on very specific issues on what does or does not work in implementing particular policies. For example, Singapore's mathematics curriculum was developed after reviewing mathematics research and practice from around the world (see Koh Kaur 2014). Recently, ministry of education personnel visited the United States and other countries to examine language teaching to non-heritage speakers (heritage speakers of a language are those who learn it at home; OECD 2011). Ministry staff have also visited a number of countries, including Hong Kong, Australia, Scotland and Sweden, to examine new kinds of assessments (OECD 2011).

11.22 As a result of these developments, Singapore classrooms incorporate a wide range of pedagogical styles that are based on evidence tested in other international countries. Principals and master teachers are continuously encouraged to examine innovations in other countries and explore how they could be adapted for use in Singaporean schools.

Summary

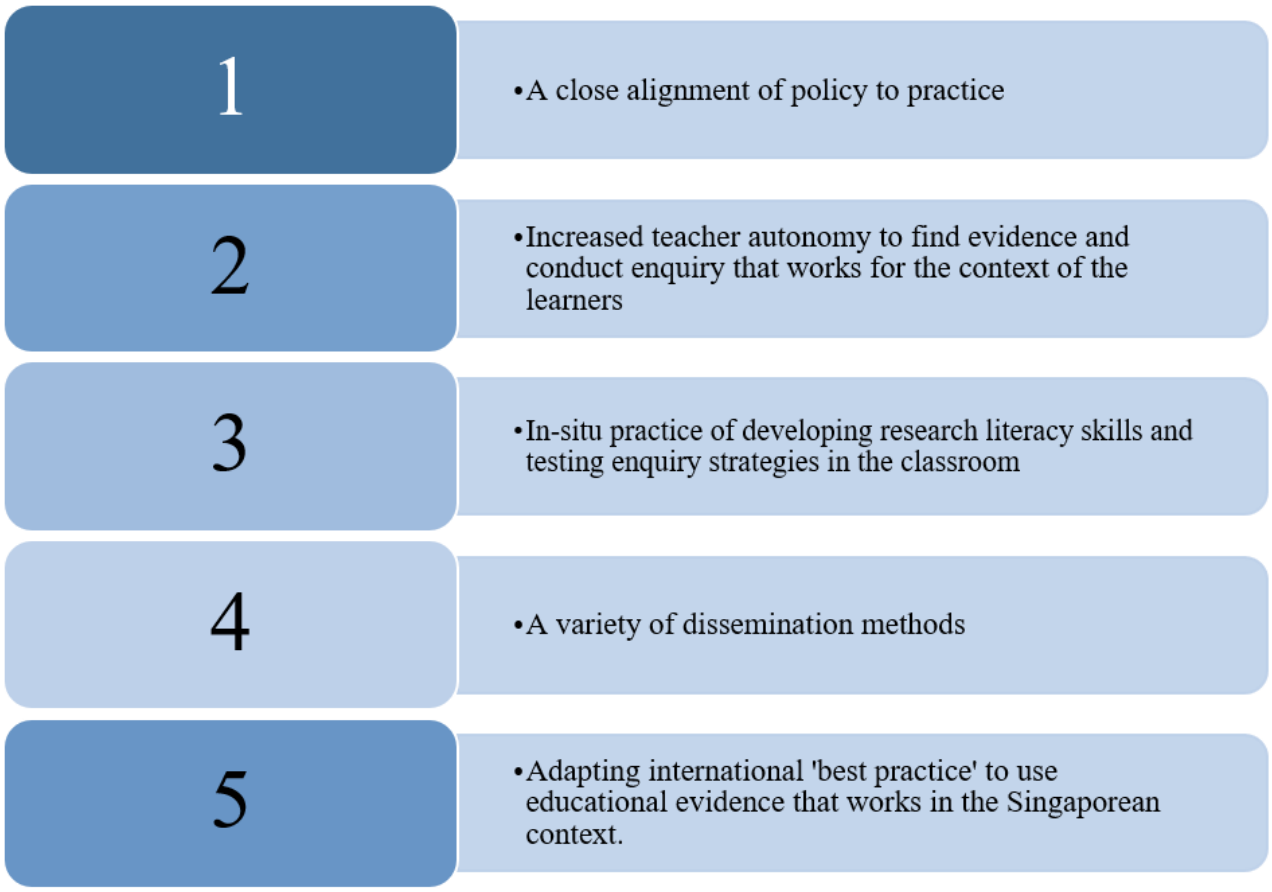


Figure 16. Key evidence take-aways from the Singapore case study.

12 Main Findings

The **main findings** of the review are:

12.1 National and local government plays a key role in developing and sustaining research and enquiry activity in schools, including the commissioning of ongoing evaluations of its impact.

12.2 This is most effectively achieved through collaboration between higher education institutions, schools and networks of schools to:

- Develop the confidence and skills of practitioners.
- Assist in embedding research evidence into practice.
- Make existing research evidence accessible to practitioners via a variety of formats.

12.3 School leaders play a critical role in this process through:

- Developing a culture within their schools that supports the use of research and enquiry.
- Ensuring that time and space is available to practitioners to undertake these activities.

12.4 Teachers' research and enquiry skills developed in initial teacher education should be reinforced and expanded through career-long professional learning.

13 Recommendations

The development of an evidence-based education profession in Wales, as part of the National Strategy for Educational Research and Enquiry, will require:

13.1 The Welsh Government, local authorities and Regional Education Consortia to:

- Offer sustained support to the development of an evidence-informed education profession in Wales.

- Commission ongoing evaluations of the impact of this development on teacher practice, pupil outcomes and system improvement.

13.2 Higher Education Institutions to be funded to work with schools, networks of schools and local authorities/Regional Education Consortia to provide the infrastructure for an evidence-based profession.

13.3 School leaders to ensure a culture that supports the use of research and professional enquiry is present within their schools.

13.4 Higher Education Institutions, local authorities and Regional Education Consortia to work closely together to provide career-long professional learning that develops the research and enquiry skills of teachers.

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