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Report

Using Evidence in the Classroom: What Works and Why?

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Using Evidence in the Classroom: What Works and Why?

Julie Nelson
Clare O'Beirne

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Executive Summary

Background

This summary presents findings from a rapid evidence review written and published by the National Foundation for Educational Research (NFER). Our review synthesises what is currently known about effective approaches to school and teacher engagement with evidence and highlights challenges and areas for attention. The report moves beyond the evidence identified through the review itself by suggesting actions needed to deal with some of the issues and challenges identified.

This review is published at a time when many organisations (including government), academics and teachers are seeking to develop strategies that will enable the teaching profession to make best use of evidence about what works in improving educational outcomes and the reasons for this. This is partly in response to increasing levels of school autonomy, which create both increased responsibility and accountability for headteachers and governors, alongside the potential for increased opportunity to shape practice.

The debate about the need for an evidence-informed teaching profession is not new. David Hargreaves' seminal lecture to the Teacher Training Agency (Hargreaves, 1996) is regarded by many as the speech that sowed the seeds for the 'evidence into education' movement (in contemporary parlance, often referred to as *knowledge mobilisation*). More recently, the debate has been reinvigorated following the impact of Ben Goldacre's paper: *Building Evidence into Education* (Goldacre, 2013). Goldacre argues that the education profession is still far from evidence based, despite the range of programmes developed during the 1990s and 2000s designed to mobilise knowledge within the profession.

Key findings

Systemic issues and solutions

When commentators talk about knowledge mobilisation (KMb), they refer to a process by which evidence is produced by research organisations, transformed into accessible and usable outputs through a process of collaboration and/or mediation, and implemented by teachers in order to develop their teaching practice and enhance learner outcomes.

In the interests of ease and clarity, we use the term KmB throughout the review when describing the use of evidence in educational practice. We recognise, however, that it ascribes primacy to evidence produced by research organisations and also describes a research community-driven sense of the importance of the use of evidence in education. With this in mind, the review also considers other, equally important, issues related to: schools' own demand for evidence (and factors that both facilitate and inhibit this); the role of teacher-led research and enquiry (either

independent of, or connected to evidence produced by research organisations); and the place of these developments within the debate about an evidence-informed teaching profession.

The 'case' for teachers engaging with evidence is that teaching practice and learner outcomes can potentially be enhanced by effective identification and application of the evidence around the most effective approaches to teaching and learning. Our review underlines that:

- KMb is not a linear process; it requires social and behavioural change on the part of researchers and teachers.
- Evidence needs to be transformed for use in practice, rather than simply summarised. This can happen through effective interaction and collaboration between teaching professionals and researchers, and/or via intermediary organisations.
- There is no current system to support evidence transformation, nor is there an identifiable group of organisations or individuals with responsibility for mediation. Responsibility is dispersed and where transformation occurs, it is piecemeal.
- The development of an infrastructure supporting KMb across England and Wales would enable a more systematic approach. In addition, a body for the teaching profession, leading on teaching and learning and on the use of evidence in education, could help to enhance the impetus for knowledge production and use within the profession.

The review firstly considers issues related to teacher engagement *with* evidence produced and transformed by researchers and then goes on to discuss teacher involvement *in* their own research and enquiry. In terms of teacher engagement *with* evidence we consider firstly best practice in knowledge production and transformation and secondly best practice in knowledge engagement and use.

Best practice in knowledge production and transformation

- A centralised knowledge base providing clear and trusted summaries of effective practice approaches (established through robust and accurate research) could help to improve teacher use of, and confidence in, evidence.
- The evidence needs to be contextualised for practice and presented in clear, accessible formats, using media which is accessible and includes practical guidelines for implementation, rather than simply being produced in its raw form.
- Intermediaries can be used to translate evidence into tools for implementation in the classroom. Collaboration between teachers and researchers can also lead to a better understanding and use of evidence.
- There is a need for much better evidence of the impact of different approaches to transforming knowledge. We need to understand more about this in order to ensure that evidence of effective educational practices is communicated to and through schools in the best ways possible.

Best practice in knowledge engagement and use

- Teachers' belief in evidence and its value is important if the vision of an evidence-informed teaching profession is to become a reality. Belief needs to be driven by the profession, although researchers can assist by improving the quality and accessibility of evidence.
- A clear voice for the teaching profession on the use of evidence to promote professional independence is required. Professional associations, amongst others, have a role in helping to facilitate this.
- A focus on the role of evidence should be strengthened amongst initial teacher training and CPD providers and providers of school leadership training. This could further be strengthened through a reflection on teachers' professional standards. Teachers should also be equipped with strategies for critically appraising and using evidence.
- There is a need for much more evidence on the relative benefits of different models of research engagement and use.

The role of teacher-led research and enquiry

- Teacher-led research or enquiry is not a homogenous activity. It serves different purposes and uses a variety of methods. At its most effective, the methods used are closely linked to, and fit for, purpose. It can be conceived to inform a national knowledge base, to support school self evaluation or improvement or to support individual-level professional development, for example.
- The methods adopted, and the factors that enable their success, are different according to the purpose of the research.
- The distinction between engaging *in* and *with* research can be overstated. Teachers undertaking research are often more disposed to engage with external evidence to support their enquiry than those who are not. The two processes are not mutually exclusive, and in the best examples, they complement each other.
- There can be an overemphasis on the development of teacher research skill as an end in its own right rather than as a means to an end (improved professional practice or better learner outcomes). Schools, collaborative networks, training providers and professional associations have a role to play here in defining the purpose of teacher-led research and enquiry and supporting best practice.

Conclusions

The findings from this review highlight that system change will not occur without coordinated action, including the development of a KMb infrastructure. **Government** is well placed to facilitate the development of such an infrastructure, but there are a variety of other parties who need to take a lead. This could include, for example, establishing an education institute for excellence .

Teacher representation bodies such as the National Association of Head Teachers (NAHT), Association of School and College Leaders (ASCL) and the National College for Teaching and Leadership (NCTL), and Teaching School Alliances, need to continue to nurture the impetus for an evidence-informed teaching profession. Education will not become evidence informed if calls emanate solely from the research community or from central government.

Schools, collaborative networks, training providers and professional associations have a key role to play in brokering key messages. These include that the distinction between teachers engaging *in* and *with* research can be overstated, and that an overemphasis on the development of teacher research skill as an end in its own right is less helpful than teacher research as a means to an end.

Research organisations and intermediary bodies need to transform (rather than simply produce, synthesise or summarise) evidence for practice. It is important that, within this process, the importance of social interaction is not overlooked.

Finally, **funding organisations** need to commission evaluations of different approaches to KMb. There is a need for: better descriptions of varied approaches; evaluations of the relative benefits of different approaches; and impact assessments of the relationship between KMb approaches, professional practice development and learner outcomes.

Methodology

The review is based upon UK literature published since 2010 and is underpinned by a systematic process for searching, screening, appraisal and synthesis. We have endeavoured to select the most methodologically sound studies for analysis. However, the research base on evidence use within the teaching profession is incredibly scant and as a result some of the approaches discussed are based upon observations or small-scale qualitative research, rather than upon trials or rigorous quantitative measurement. The review team adopted a three-stage process to filtering the search results.

- **Screening** – all identified items (426) were ‘screened’ for relevance (on the basis of information provided in abstracts) using a detailed coding frame. Thirty ‘key items’ were identified as a result.
- **Appraisal** – using a detailed appraisal template for each selected item, the review team read and summarised each key item under a number of key headings related to research design, study findings, and relevance.
- **Synthesis** – the reviewed data was analysed in order to draw out emerging themes and key messages.

The review was assisted by the support of two expert advisers, Dr Jonathan Sharples of the Education Endowment Foundation and Dr Caroline Kenny of the EPPI Centre at the Institute of Education.

1 Introduction

This rapid evidence review is written and published by the National Foundation for Educational Research (NFER). NFER is an independent charity working to provide evidence that improves education and learning, and as a result, the lives of learners.

The review has been undertaken to underpin the *Teacher Development* strand of the NFER Research Programme.¹ This Programme focuses on topics that NFER believes to be important, or undeveloped, and where we feel that our research skills and depth of subject expertise can offer valuable insights and contribute to improving the education and wellbeing of learners. The Programme is jointly funded by NFER in collaboration with partners who have a strong interest in its topics and share our values and objectives. Projects and activities within the *Teacher Development* strand of the Research Programme seek to identify how excellence in teaching and learning can be promoted and effectively spread to secure the best possible outcomes for young people. Part of the strand's remit is to better understand the factors that enable the *effective use of evidence* by schools and teachers in developing professional practice and improving outcomes for learners.

The review is published at a time when many organisations (including government), academics and teachers are seeking to develop strategies that will enable the teaching profession to make best use of evidence about what works in improving educational outcomes and why. This is partly in response to increasing levels of school autonomy, which create both increased responsibility and accountability for headteachers and governors, alongside the potential for increased opportunity to shape practice. Campbell and Levin (2012) comment that the increasingly decentralised school system in England presents both opportunities and challenges:

On the one hand, increased school autonomy may provide new impetus for schools to seek out and embed evidence-based practice in order to increase attainment and efficiency ... On the other hand, the autonomy of individual schools may make it harder to bring research to bear on practice systemically and at scale [...] Put bluntly, mobilising knowledge in 20,000 individual schools is not an easy task.

(Campbell and Levin, 2012, p. 9)

Our review synthesises what is currently known about effective approaches to school and teacher engagement with evidence and highlights 'weak spots' or areas for attention. The specific foci of the review are to:

- draw together recent contributions (2010 onwards) to the debate about approaches to developing an evidence base within schools and the teaching profession in England and Wales;
- identify factors that enable effective use of evidence within schools and the teaching profession;

¹ This strand was previously known as *Developing the Education Workforce*. Other strands are: *From Education to Employment*, and *Innovation in Education*. <http://www.nfer.ac.uk/research-programme/>

- discuss ways in which evidence is being used in practice;
- consider evaluations of the effectiveness of different approaches to evidence use in terms of impacts on teacher engagement or classroom practice, and pupil outcomes;
- identify areas for attention and propose solutions.

We have not included literature relating to evidence use within **other professions**, or **other countries' education systems** within the systematic searches undertaken for this review. It is generally accepted though that evidence is more effectively (although not perfectly) used within professions such as medicine and healthcare, and that there are interesting examples of evidence use within the teaching profession in countries such as the USA and Canada. We will be exploring opportunities to consider the lessons that can be learned from these, as they relate to the education system in England and Wales, over the coming months.

1.1 Methodology

The review is underpinned by a systematic process for item searching, screening, appraisal and synthesis. This process is important and underlines the fact that the review has identified relevant evidence in an unbiased and transparent way. Through our screening processes we have endeavoured to select the most methodologically sound studies for analysis (Appendix D shows how item robustness was determined). However, the research base relating to tried and tested methods of developing evidence use within the teaching profession is incredibly scant (there are no randomised controlled trial (RCT) studies, for example) and hence we have had to adopt a 'best available evidence' approach to item selection. This means that some of the approaches discussed are based upon observations or small-scale qualitative research, rather than upon trials or rigorous quantitative measurement, a key finding in its own right.

Details of the systematic search that was undertaken for this review are provided in Appendix B. Following the search, the review team adopted a three-stage process to filtering the search results. This process is outlined in detail in Appendix C, but in brief, it consisted of the following:

- **Screening** – all identified items (426) were 'screened' for relevance (on the basis of information provided in abstracts) using a detailed coding frame. Thirty 'key items' were identified as a result.
- **Appraisal** – using a detailed appraisal template for each selected item, the review team read and summarised each key item under a number of key headings related to research design, study findings, and relevance.
- **Synthesis** – the reviewed data was analysed in order to draw out emerging themes and key messages. The synthesis was guided by the review foci outlined in Section 1.

The review was greatly assisted by the support of our expert advisers, Dr Jonathan Sharples of the Education Endowment Foundation, and Dr Caroline Kenny of the EPPI Centre at the Institute of Education who supported the work at all stages. They provided suggestions of potential literature (in addition to NFER's own search results),² were consulted about key

² Suggestions were subjected to our screening criteria – see Appendix C.

item selections, and helped to steer the content and focus of this report, based on a presentation of headline findings in September 2013 and a draft final review in October 2013.

1.2 Context

The debate about the need for an evidence-informed teaching profession is not new. David Hargreaves' seminal lecture to the Teacher Training Agency (Hargreaves, 1996) is regarded by many as the speech that sowed the seeds for the 'evidence into education' movement. Hargreaves was highly critical then of the fact that the evidence base in education was incredibly weak, despite huge annual spending on educational research within and among academic institutions.

For a teacher to cite research in a staffroom conversation about a pupil would almost certainly indicate that he or she was studying for a part-time higher degree in education or rehearsing for an Ofsted inspection - and would be regarded by most colleagues as showing off.

(Hargreaves, 1996, p. 5)

1.2.1 Historical developments

Hargreaves' paper was quickly succeeded by a number of studies that explored the issue further, often drawing comparisons with other professions such as medicine and social care, where the evidence base was then, as now, regarded as much more established (see, for example, Hargreaves, 1998; Davies *et al.*, 2000; Thomas and Pring, 2004; Nutley *et al.*, 2007). And it wasn't solely the academic community that was discussing the need for better use of evidence. The Tooley Report to Ofsted (Tooley and Darby, 1998) articulated the importance of education policy being firmly grounded in social scientific results, while the government's white paper, *Modernising Government* (GB. Parliament. HoC, 1999) emphasised the importance of evidence in developing public services. In 2002, the Treasury Spending Review (GB. Parliament. HoC, 2002) concluded that the relationship between research, policy and practice needed to be improved.

There then followed a series of programmes and resources developed to improve the quality of educational research, its accessibility and usability, and ultimately, its impact on teaching practice (Bevins *et al.*, 2011; Borg, 2010; Gough, 2013; Haslam, 2011; Hulme, 2013; Saunders, 2010).

The largest of these was the Economic and Social Research Council (ESRC)-funded Teaching and Learning Research Programme (TLRP), which attracted over £40 million in funding between 1999 and 2012. It was developed to support leading-edge research that would inform teaching and learning throughout the UK and to build research capacity in education within UK universities. (Details of the impacts of TLRP are provided in Section 3.2.1). The government-funded National Education Research Forum (NERF) had a remit to bring together academic researchers and policy makers to develop a strategic approach to KMB, while the ESRC funded the Teacher Education Research Network (TERN) and the Applied Education Research Scheme (AERS). There was also the Teacher Training Resource Bank (TTRB) and The Research-Informed Practice Site (TRIPS), both evidence-

based resource banks developed for teachers. Additionally, NFER hosted CERUK plus, a government-funded database of current education research topics, which was free to search. The educational evidence portal (eep) was developed as a joint venture by a group of organisations, including NFER, who aimed to make research evidence more widely available through a searchable portal.

There was also some government funding and support for schools taking part in their own research or enquiry. The then Department for Education and Skills (DfES) funded its Best Practice Research Scholarships, while the Teacher Training Agency (TTA) ran its School-based Research Consortia and the then National College for School Leadership (NCSL) hosted Network Learning Communities. Funding for all of these initiatives ceased at various points between 2006 and 2012.

However, the National Teacher Research Panel (NTRP), an independent group of teachers and headteachers with research expertise who support and encourage other teachers to engage in and with research, remains active and is supported by the Centre for the Use of Research and Evidence in Education (CUREE).³ The Collaborative Action Research Network (CARN), founded in 1976 is also still active. This is a network of teacher action researchers, which has grown to become international (and incorporating more professions) over the years. It is hosted by Manchester Metropolitan University's Education and Social Research Institute.⁴

1.2.2 Current debates

So we know that the debate about evidence-informed practice is not new. We also know that there has been an array of multi-million pound programmes, collaborations and resources over recent years, all of which have aimed to improve the flow and take up of evidence for practice. But how successful have these been? And why is it that we are still discussing how best to improve the evidence base in education after all of these efforts? Gough (2013) suggests that many of the outlined initiatives failed to work as well as anticipated because their systems were too new and, critically, because they lacked central coordination. He also makes the following point, which we return to in Section 2:

Most of the initiatives were in terms of the 'push' of production of research, rather than changing the organisational and individual professional drivers on the use of research.
(Gough, 2013, pp. 74–75)

The debate about evidence-informed practice has been reinvigorated recently following the impact of Ben Goldacre's paper: *Building Evidence into Education* (Goldacre, 2013). Goldacre argues that the education profession is still far from evidence based, despite the range of programmes developed during the 1990s and 2000s to mobilise knowledge within the profession. He draws parallels with the medical profession (where, since the 1970s, there has been a tradition of professional engagement with external evidence, and related evidence-informed clinical decision making). He also favours an approach where RCTs are a key basis of a research-based education profession. Goldacre's views are currently highly influential, which is reflected in the fact that the Department for Education (DfE)

³ <http://www.ntrp.org.uk/>

⁴ <http://www.esri.mmu.ac.uk/carnnew/>

commissioned him, alongside another external expert, to consider the role of research, analysis and data across the DfE, English schools and children's services (DfE, 2013).

Goldacre's vision is for systemic change. He envisages Education Trials Units working with networks of research-engaged schools to undertake rigorous research to find out 'what works' in various aspects of educational practice. He sees this information being fed effectively to schools and teachers; and he sees teachers actively critiquing the findings, putting them into practice and monitoring and evaluating the results in their individual settings. He also favours scope within the system for teachers to raise questions and make suggestions about topics that they would like to see researched, thereby having direct influence on the future research agenda.

The processes behind such a vision are, of course, by no means straightforward. If they were, it is likely that David Hargreaves' call of 1996 would have led to substantial developments by now. Goldacre's vision requires seismic cultural and system change if it is to become reality.

The following section (Section 2) considers some of these systemic issues, and proposes a number of solutions. In Section 3, we discuss best practice in research production and transformation; and in Section 4, best practice in research engagement and use. Section 5 focuses specifically on the role of teacher-led research and enquiry, providing examples of approach and evidence of impact. We conclude the review in Section 6 with a variety of implications related to: systemic considerations; issues around knowledge production, transformation and use; the purpose and value of teacher-led research and enquiry; and the nature of the evidence base, asking the question: what works and why?

2 Systemic Issues and Solutions

It is unreasonable and even undesirable to expect individual teachers or principals to be the key consumers of research findings – practice needs to be changed at the system level.

(Levin, 2013, p. 18)

Summary of key issues and solutions:

- Producing and adapting evidence for practice is not a linear process – it requires social and behavioural change on the part of researchers and teachers.
- Evidence needs to be transformed (not simply summarised) for use in teaching practice. This can happen through effective collaboration between teachers and researchers (social interaction), and/or by ‘mediation’ via intermediaries (linkage).
- There is no current system to support evidence transformation. Nor is there an easily identifiable group of organisations or individuals with responsibility for mediation. Responsibility is dispersed and where transformation occurs it tends to be piecemeal.
- The development of an infrastructure supporting KMb across England and Wales would enable a more systematic approach to evidence use in schools. Government may be in a position to facilitate the initial development of such an infrastructure, but a range of other organisations are well placed to operationalise the various elements.
- Proposals for, and debates about, a Royal College of Teaching should consider the potential of such a body to champion and coordinate the use of evidence in education among the teaching profession.

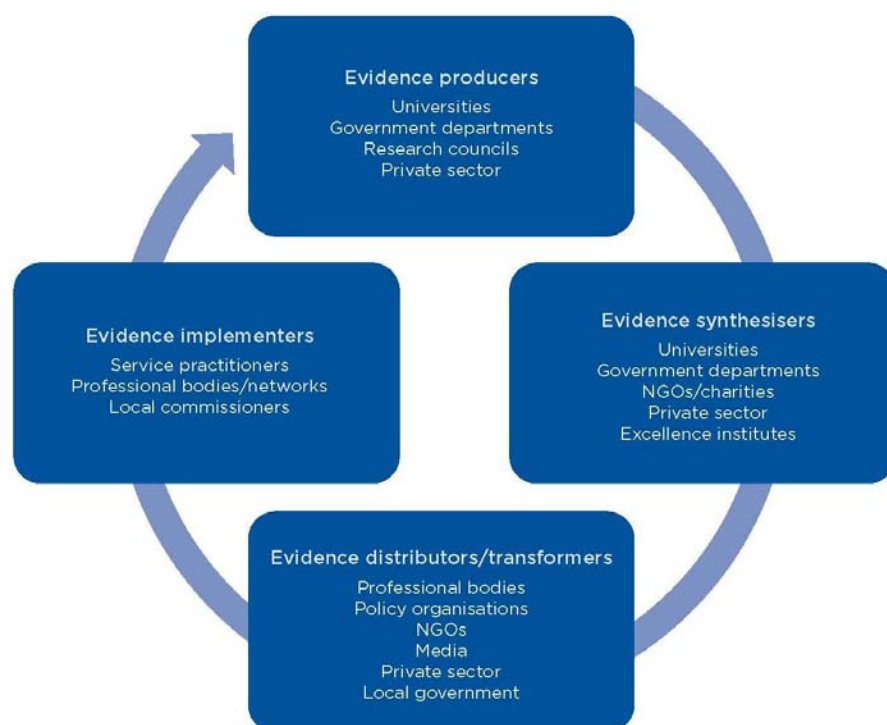
In a recent paper: *Evidence for the Frontline*, Jonathan Sharples (2013) presents the components of what he terms a ‘knowledge mobilisation (KMb) ecosystem’. Put simply, KMb is the process by which evidence is produced by research organisations, transformed into accessible and usable outputs through a process of collaboration and/or mediation, and implemented by teachers in order to better their teaching practice and enhance learner outcomes. His ecosystem is illustrated in Figure 1.

In the interests of ease and clarity, we use the term KMb throughout this review when describing the use of evidence in educational practice. However, we recognise that it ascribes primacy to evidence produced by research organisations and also describes a research community-driven sense of the importance of the use of evidence in education. In Section 5 of the review we consider equally important additional issues related to: schools’ own demand for evidence (and factors that both facilitate and inhibit this); the role of teacher-led research and enquiry (either independent of, or connected to evidence produced by research organisations); and the place of these developments within the debate about an evidence-informed teaching profession. Figure 6 on page 28 illustrates these issues visually.

For a full description of the term KMb, and a range of other descriptions of research engagement that are used throughout the review, see the glossary at Appendix A.

Returning for now to the issue of how evidence produced by research organisations can best be adapted and made available for practice, Sharples' ecosystem demonstrates that KMb is not a linear process in which academic institutions produce research about 'what works', with teachers implementing the findings in their classrooms. Rather, KMb requires social and behavioural change (Levin and Campbell, 2012). Knowledge needs to *mobilised* so that it becomes accessible, relevant and usable. And this does not happen solely by research institutions providing research findings in formats that they believe will be accessible for schools (although this is a useful step in the process).

Figure 1 Elements of an evidence ecosystem (Sharples, 2013, p. 9)



The critical component of this ecosystem is the *transformative process* whereby research evidence (produced, synthesised and presented in accessible formats for teachers) is transformed into useful guidelines for implementation. Such guidelines need to incorporate factors like management considerations, costs and training requirements. In other words, if we genuinely want schools to access and use the best available external evidence, then that evidence must be transformed (not simply summarised) for use in everyday practice. Good quality evidence syntheses provide an essential knowledge base to underpin school-level implementations, but they rarely provide the specific detail that teaching professionals need if they are to be encouraged to consider the implications for their practice seriously. School decision makers and teachers need guidelines about **how** to put research into action.

So here is the challenge. Who is, or what systems are, best placed to ensure that an effective transformation of evidence for practice takes place?

Researchers' natural comfort zone is research (and sometimes synthesis) production, while teachers' professional expertise lies in pedagogy and classroom management. Are researchers sufficiently well placed to 'reach forward' to practice in order to transfer their knowledge, and do teachers have the skills to 'reach backwards' to research? (Sharples, 2013). Is there space for a useful meeting in the middle? Read *et al.* (2013) believe that this middle ground is important territory:

Research knowledge is mobilised effectively when organisational leaders, practitioners, policy makers and researchers from different institutions and contexts learn together using research to inform thinking and professional practice.

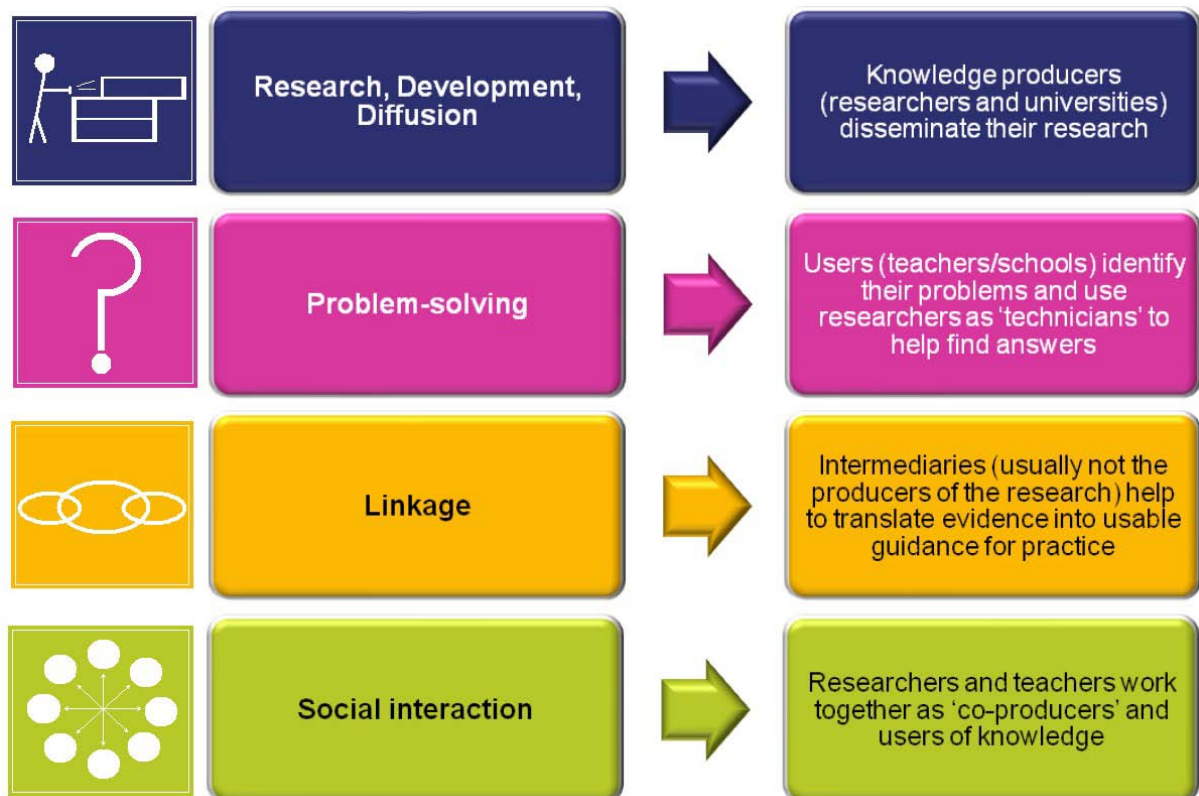
(Read *et al.*, p. 25)

This suggests that there needs to be better interaction and collaboration between researchers and teaching professionals if knowledge is to be mobilised effectively. Others believe that there needs to be additional involvement from intermediary organisations with understanding both of research and teachers' needs. Campbell and Levin's description of evidence use (2012) highlights a process similar to Sharples' 'ecosystem' (research production, transformation and use), but focuses specifically on 'mediation' as the focal point for the transformation process.

Campbell and Levin describe potential mediators as charities, professional associations, unions, academy chains, local authorities (LAs) and the media, amongst others. They describe their role as being to **locate** useful research and make it freely available to schools; **understand** the implications of research for practice and be able to explain these to teachers and other stakeholders; **share** messages, ensuring that these travel between schools and across the education system; and **act** on research findings, ensuring that schools are supported to embed research in their practice. They do not mention the potential role of such mediators in **taking** messages and questions from schools and teachers to researchers however.

Becheikh *et al.* (2009) propose four models of research production and use, but divide the process of mediation (described by Campbell and Levin, 2012) into two components – 'linkage' and 'social interaction.' These models provide a helpful framework for categorising the variety of approaches to KMB that we have identified through this review. We therefore use them (and their related symbols) to describe the approaches to KMB discussed throughout Sections 3 and 4.

Figure 2 Models of evidence transformation (adapted from Becheikh *et al.*, 2009)



In the social interaction model, the transformation process is aided, not just by intermediaries, but also by close collaboration between teachers and researchers. Becheikh *et al.* (2009) comment:

The social interaction framework offers a dynamic perspective to study knowledge transfer. It puts an equivalent emphasis on both researchers and knowledge users. It also stresses the importance and the critical role of linkage mechanisms to ensure an efficient knowledge transfer between the two communities.

(Becheikh *et al.*, p. 6)

In practice there is no coherent system in place in England to support evidence transformation. Nor is there an easily identifiable group of organisations or individuals with responsibility for mediation. While many commentators outline the **principles** of an effective KMB process, we cannot yet claim that such a system is firmly embedded (although there have been positive developments over recent years (see pages 10–11). Fenwick and Farrell (2011) ask: 'Where does responsibility lie for engaging non-researchers in knowledge production and use, [and] configuring research findings in formats and forums that are truly accessible and attractive to users?' (p. 4)

The reality is that responsibility is currently dispersed and that transformation, where it occurs, tends to be piecemeal. This is compounded by the increasingly decentralised nature of the English school system (CUREE, 2011; Levin, 2013; Sharples, 2013).

Best and Holmes (2010), writing in the context of healthcare, note that KMB also needs to be understood within the context of *system change* and that factors need to be considered such as: the degree of readiness for innovation; the context for implementation; and the

processes in place for fostering and managing change. Best and Holmes note that system thinking highlights:

The need to ensure readiness and sufficient capacity... distributed, collaborative leadership...[and] the critical role of strategic communications to catalyse, coordinate and support change [...] before launching major knowledge to action [KMb] initiatives.

(Best and Holmes, 2010, pp. 154–155)

Commentators point out that a ‘KMb ‘system’ (such as that proposed by Sharples, 2013; Campbell and Levin, 2012; Becheikh *et al.*, 2009) is unlikely to come to fruition without a coordinated set of actions, including the development of some form of supporting infrastructure and a focus on cultural change. But how likely, within the current autonomous, decentralised education system is it that central or local government will wish, or have the capacity, to take responsibility for such coordination? Sharples’ (2013) opinion is that:

Although governments do not need to provide any of the individual functions involved in supporting research use, they do have a major role in managing the overall system and ensuring that the necessary agents and infrastructure are in place.

(Sharples, 2013, p. 8)

If we return for a moment to Figure 1, it is relatively easy to locate the ‘weak spots’ in the process, or the components that are most likely to require support or infrastructural development if knowledge is to be effectively mobilised. Evidence **production** is fairly abundant (although there are criticisms about quality and consistency – see Figure 3, page 13). Evidence **syntheses** are also commonplace, being undertaken by a variety of organisations, from universities and research institutes, to specialist review centres such as the Evidence for Policy and Practice Information and Coordinating Centre (the EPPI-Centre)⁵, and the Campbell Collaboration (C2)⁶ (Dagenais *et al.*, 2012; Sharples, 2013). The Education Endowment Foundation (EEF)’s Pupil Premium Toolkit⁷ is a ‘what works’ output, based on a large amount of synthesised data that is accessed by many schools. The various outputs from the Institute for Effective Education (IEE) at York University, such as ‘Better’ and ‘Best Evidence in Brief’ are also a useful source of information for schools and policymakers – providing the latest evidence on educational interventions.⁸ At NFER, we also produce ‘In the News’, ‘Education in the News’ and ‘On the Web’ – current bulletins on news, policy and research in education.⁹ We also produce a ‘news and policy digest’ for primary practitioners in collaboration with Oxford University Press.¹⁰

However, there is no direct equivalent in education to the clearing houses or excellence institutes that are a feature of the medical and social care professions (such as the National Institute for Health and Care Excellence (NICE)¹¹ and the Social Care Institute for Excellence (SCIE)).¹² Some authors argue that this would be a useful development for the education profession (CUREE, 2011; Dagenais *et al.*, 2012; Levin, 2013; Sharples, 2013). It

⁵ <http://eppi.ioe.ac.uk>

⁶ www.campbellcollaboration.org

⁷ <http://educationendowmentfoundation.org.uk/toolkit>

⁸ <http://www.york.ac.uk/iee/>

⁹ <http://www.nfer.ac.uk/what-we-offer/>

¹⁰ <https://global.oup.com/education/primary/news?region=uk>

¹¹ <http://www.nice.org.uk/>

¹² <http://www.scie.org.uk/>

would not only support the consistent production of evidence syntheses, but could potentially ensure that there was a central organisation with responsibility for coordinating the collation of synthesised evidence and **transforming** it into useable formats for the teaching profession.

Although The EEF¹³ (one of six Cabinet Office ‘what works centres’) is funded to provide robust, comprehensive evidence to guide decision making on educational spending (HM Government, 2013) and is a major funder and producer of evidence, there is, as yet, no one organisation coordinating or undertaking the above activities on a systematic basis. The EEF is moving into the area of transforming evidence for practice, backed by an Economic and Social Research Council (ESRC) grant.¹⁴ This raises the prospect of better understanding about how best to transform evidence for practice and how to assist the process of implementation in schools. But there is still much more work to be done if schools are to be effectively supported to put evidence into practice effectively .

There are a number of organisations that potentially have the skill and capacity to play a part in a coordinated ecosystem. These include CUREE (a centre of expertise in evidence-based practice in all sectors of education);¹⁵ the Coalition for Evidence-based Education (CEBE) (an alliance of researchers, policymakers and practitioners who are interested in improving the exchange and use of evidence across the education system),¹⁶ the Alliance for Useful Evidence (a network of individuals from across government, universities, charities, business and LAs that champions the use of evidence in social policy and practice),¹⁷ multiple university education departments (including the Institute of Education), and ourselves at NFER (an educational charity that aims to improve education and learning, and hence the lives of learners, by providing independent evidence).¹⁸

The issue remains, however, that there is a need for coordinated change, led at a whole-system level. Some see a role here for an education institute for excellence (or similar body) at some point in the future, or for a professional representation body such as the proposed Royal College of Teaching (if this was developed with a remit for encouraging and supporting the use of evidence within the profession, as has been suggested might be the case in oral evidence submitted to the Education Select Committee (GB. Parliament. HoC. Education Select Committee, 2013, p. 34)). Without such leadership, it is likely that our approach to KMb within the teaching profession in England will remain piecemeal.

¹³ <http://educationendowmentfoundation.org.uk/>

¹⁴ <http://educationendowmentfoundation.org.uk/news/eef-and-esrc-announce-collaboration-on-research-impact>

¹⁵ <http://www.curee.co.uk/>

¹⁶ <http://www.cebenetwork.org/>

¹⁷ <http://www.alliance4usefulevidence.org/>

¹⁸ <http://www.nfer.ac.uk/about-nfer/> NFER supports schools and teachers, in various ways, in their engagement with research. Methods include on-line materials, our *Enquiring Schools* consultancy service, and our accreditation of effective teacher engagement with research - *Research Mark*.

3 Best practice in knowledge production and transformation

So far we have discussed the context of current debates about KMb, and have considered fundamental questions about the systemic changes that are needed. We now consider the factors that can challenge and support progress in knowledge production and transformation (Section 3.1) and look at some models of knowledge production and transformation and their relative effectiveness (Section 3.2).

Summary of key enablers and implications:

- A high quality, trusted knowledge base providing clear summaries of effective interventions (established through robust and accurate research) could help to improve teacher use of, and confidence in, evidence.
- Evidence needs to be contextualised for practice and presented in clear, accessible formats, using accessible media, with practical guidelines for implementation, not simply produced in its raw form.
- Intermediaries can help translate evidence into tools for implementation in the classroom. Additionally, collaboration between teachers and researchers can lead to better understanding of, and implementation of, evidence.
- There are very few descriptions of different approaches to knowledge production and transformation and even fewer evaluations of their relative effectiveness. We need to understand more about the best approaches to transforming knowledge to ensure that evidence of effective educational practices is communicated to and through schools in the best ways possible.

3.1 What enables effective production and transformation of evidence?

There are a number of challenges to the effective production and transformation of evidence by universities and research organisations. These relate to three key steps in the knowledge production and implementation process:

1. Generating high quality, timely and relevant research.
2. Adapting research findings for practice.
3. Supporting implementation of findings into practice.

The diagram below provides more detail of the nature of the challenge in relation to each of these steps and identifies a range of factors that have been identified as having the potential to overcome these. It is important to note that many of these enabling factors are currently 'aspirational'. If they are to become reality, there needs to be close attention to the systemic issues outlined in Section 2 and some of their potential solutions.

Figure 3 Challenges and enablers in evidence production and transformation

Challenges – evidence is...

Enablers

<p>1. Poor quality Research sometimes fails to build on previous knowledge and is too small scale or poor quality to be replicable (Gough, 2013; Levin, 2013). Schools are left to access and use findings from individual studies of variable quality, making it challenging for them to gain a complete picture of research on any given topic (Gough, 2013).</p>	<p>Centralised knowledge base - A publicly-available knowledge base offering clear evidence of effective interventions, including those which improve outcomes for learners could help school access and use evidence (CUREE, 2011; Goldacre, 2013). Focus on robustness - Educational trials units can help to support good-quality research to ascertain ‘what works’ (Goldacre, 2013). Process evaluations can help understanding of how, why and in what conditions different approaches are effective. Interventions which involve practitioners in research also help facilitate the quality of the evidence base</p>
<p>2. Insufficiently contextualised/inaccessible Research is not always contextualised for everyday practice (Sharples, 2013; Bannister <i>et al.</i>, 2011; Borg, 2010; Procter, 2012; Levin, 2013; CUREE, 2011; Gray, 2013). Researchers ‘struggle to develop their findings into something that can be easily applied in schools’ (Haslam, 2011). Research can also appear inaccessible due to academic language and extensive detail (Borg, 2010; Geest, 2010; Levin, 2013; Procter, 2012).</p>	<p>Will - Researchers need to be willing to incorporate the expertise and experience of teachers. This can help enrich their research (Edwards, 2011). Content - Researchers need to provide clear evidence about what works, in what contexts and at what costs. Messages should be accessible and timely; objective; easy to understand and implement; and relevant to professional practice. There is a need for: ‘user specific outputs, clearly written, de-jargonised’ (Parsons and Burkey, 2011, p. 19). Medium - Researchers need to understand practitioner needs and respect their stance (Sharples, 2013; Bannister <i>et al.</i>, 2011; Dagenais <i>et al.</i>, 2012; Parsons and Burkey, 2011; Gough, 2013; Weston, 2013). Evidence needs to be presented through accessible media rather than in obscure journals. Research summaries or digests are more likely to be accessible and useable than research reports or journal articles (Borg, 2010).</p>
<p>3. Insufficiently supportive of implementation Researchers can lack skills or interest, or feel there is insufficient credit, for engaging with non-academics (Bannister <i>et al.</i>, 2011; Campbell and Levin, 2012). ‘Research engagement which is unsupported and leads to abortive projects or flawed interpretation of findings can do more harm than good’ (Wilkins, 2012, p. 68).</p>	<p>Intermediaries (also known as knowledge brokers) can help translate evidence into useful tools and can work with teachers and researchers to facilitate engagement (Sharples, 2013; Bannister <i>et al.</i>, 2011; CUREE, 2011; Nutley, 2013).¹⁹ Collaboration between researchers and practitioners through networks and partnerships can lead to a deeper understanding and sense of ownership of evidence by practitioners and a greater understanding of what needs to be done to implement key findings (Edwards, 2011; Sharples, 2013; Goldacre, 2013; Haslam, 2010; Dagenais <i>et al.</i>, 2012; Nutley, 2013).</p>

¹⁹ These might include organisations such as charities, academy chains, LAs, think tanks or research centres (Campbell and Levin, 2012; Levin, 2013).

3.2 Approaches to knowledge production and transformation

There are surprisingly few examples in the literature of approaches to the production of evidence by research organisations and its transformation for practice. Taking Becheikh *et al.*'s models (2009) as a basis for investigating different types of approach (see Figure 2), it is possible to identify a small number of specific approaches.

3.2.1 Research, Development, Diffusion



The Teaching and Learning Research Programme (TLRP) was essentially a very large-scale example of a 'science push' approach, where the focus was upon better production and dissemination of evidence by researchers and universities. The programme did provide funding for groups of schools to conduct their own research, and attempted to build collaborations between schools and researchers. However, its central focus was encouraging better links between universities, academics and researchers in order to strengthen the evidence base for practice (Parsons and Burkey, 2011; Pollard, 2011). So what impact did this £40 million programme have on teachers' engagement with evidence?

Box 1 – The impact of TLRP

Practitioner communities directly involved in TLRP had high levels of awareness of the programme, particularly welcoming its dissemination of quality materials supported by seminars, e-mail networking and peer support networks. However, there was very little *wider* awareness of TLRP among the teaching profession as a whole. Where schools were involved in TLRP *inputs*, their awareness and appreciation of the programme and its outputs was high. In contrast, where schools were only in receipt of TLRP outputs, awareness of the programme, and its offer, was very low. This does not necessarily mean that teachers did not appreciate, or use the materials. Rather, they lacked familiarity with TLRP's specific branding. In some cases, TLRP materials were adapted or augmented for use in CPD activities, without TLRP-specific acknowledgement. Parsons and Burkey (2011) comment: 'It is extremely difficult, if not impossible, to ascribe cause and effect to any programme in the context of such peer-to-peer development of practice' (p. 33).

So what can we learn from the experience of TLRP? Parsons and Burkey (2011) identify the following points:

- Facilitation and brokerage by researchers or intermediaries helping teachers to understand research findings are essential. This is an approach that may not come readily to some academic research teams.
- Serious consideration needs to be given to the time taken to demonstrate impact on practice. A case is made for 'legacy resources' to ensure that achievements are not lost when funding comes to an end (as was the case for TLRP).
- It is as important to measure the development of relationships and influence, as it is to measure disseminated project outputs. Pollard (2011) comments: 'Although it is unlikely

that impact can be achieved without the production of outputs, they do not, in themselves constitute impact' (pp. 36–37).

So what does the literature tell us about approaches to developing relationships, in order to influence the use of evidence in practice?²⁰

3.2.2 Linkage



There are a few indications of approaches to effective linkages between producers and users of evidence, and just one specific example, which is outlined below.

Box 2 – Linkage through a ‘feedback loop’

In her review of approaches to KMB, Edwards (2011) provides an example in which researchers worked closely with partner schools to tailor a research project. The schools were not involved in the research production themselves; rather they acted as participants, with the researchers attempting to conduct effective research that would help inform their practice. The mechanism for knowledge exchange was described as a ‘feedback loop’. Researchers regularly presented emerging findings to participants and requested feedback and comment in order to inform the next stages of the research. In this example, the line between researchers and participants was firmly drawn, but practitioners had a key role to play in ‘fine tuning’ the research and ensuring the relevance of its results and outputs to their practice. There is no evaluation of the effectiveness of this approach however.

3.2.3 Social interaction

The social interaction model is often presented as the ideal approach to mediating the process of evidence transformation (Becheikh *et al.*, 2009; Levin, 2013; Read *et al.*, 2013; Saunders, 2010). Certainly evidence from evaluations of TLRP shows that researchers, and the evidence that they produced, had more impact on pedagogical practice where mediation took place, and where there was an attempt at building research/teacher collaborations, than when the primary approach was the research diffusion model (Parsons and Burkey, 2011; Pollard, 2011). There are few published or evaluated examples of the social interaction model in practice, although we know that some developments are underway. The University of East Anglia’s *School: University Partnership Programme* is an interesting, large-scale illustration of this approach, for example.²¹



²⁰ There are no examples of Becheikh *et al.* (2009)’s ‘problem solving’ model that are relevant to this section. Problem solving is essentially a knowledge ‘use’ model and is discussed in Section 4.2.2.

²¹ See: <http://www.uea.ac.uk/biological-sciences/engagement/school-engagement/school-university-partnership-programme>

Box 3 – Researcher-teacher interaction

Saunders (2010) provides one example of a researcher working with a small group of teachers on a face-to-face basis to help them use the outcomes of his research review on the teaching of sustainable development. Both parties had to overcome a variety of challenges including: accessing and working with ‘academic language’; deciding how best to apply sometimes inconclusive findings to practice; and researcher willingness to ‘yield’ ownership of the work. Saunders comments:

This is an intense, messy and tough process which must be understood in terms of professional development – adult pedagogy – and resourced accordingly.

(p. 20)

Levin (2013) notes that social interactions such as those outlined above can be aided and assisted by intermediaries.

One passing reference is made to an example in which teachers were supported by external facilitators to engage in enquiry-led processes. The enquiry was designed to build teachers’ and school leaders’ pedagogical knowledge. However, precise details of the approach are not provided. Nor are details of the supporting organisation (CUREE, 2011). Levin’s vision for knowledge transformation assisted by intermediaries remains a laudable aspiration nonetheless.

Three points emerge from this analysis of methods and approaches in knowledge production by researchers:

1. **There are very few published examples** of different strategies and approaches to producing and transforming knowledge for practice. It would be helpful, over time, for there to be more documentation and analysis of the strategies that are being used to mobilise knowledge within the teaching profession.
2. **There is little evaluation of the effectiveness of different approaches in mobilising knowledge**, although we know from the evaluation of TLRP that this extensive programme was not wholly effective in developing a knowledge-informed teaching profession. Evidence from this experience supports the views of commentators such as Sharples (2013) and Levin (2013) that an evidence ‘ecosystem’ must encompass more than the *dissemination* of good quality research by universities and other research organisations. Ideally, however, we still need evaluations that consider the *relative* benefits, or conditions for effectiveness, of different types of approach (such as Becheikh *et al.*’s, 2009, models) in order to achieve some degree of *comparative* understanding.
3. **There is no evidence whatsoever about the ultimate impact of different approaches to mobilising knowledge on pupil outcomes.** We need to understand more about the best approaches to mobilising knowledge in order to ensure that evidence of effective educational practices is communicated to and through schools in the best ways possible.

4 Best practice in knowledge engagement and use

We now move on from issues of knowledge production and transformation to consider a variety of factors and approaches that can enable effective engagement with, and use of, external evidence by schools. We firstly consider factors that can challenge and support progress in knowledge use (Section 4.1) and then explore some models of knowledge use and their relative effectiveness (Section 4.2).

Key enablers and implications:

- Teachers – particularly school leaders – need to believe in and value evidence if the vision of an evidence-informed teaching profession is to become reality. This belief needs to be driven by the profession, not by the research community (although researchers can do much to improve the quality and accessibility of evidence to further the cause).
- There needs to be a clear voice for the teaching profession on the use of evidence to promote professional independence. A variety of professional associations have a role to play here.
- ITT and CPD providers, as well as providers of school leadership training and those responsible for school standards should strengthen their focus on the role of evidence. They should equip teachers – particularly school leaders - with strategies for critically appraising and using it.
- There are very few descriptions of different approaches to knowledge use and no evaluations of the comparative advantages of one approach over another. There is a need for much more evidence of the relative impacts of different models.

4.1 What enables effective school use of externally produced evidence?

There are two key challenges to effective engagement with, and use of, external evidence by schools and teachers. These relate to:

1. teachers' beliefs, values and priorities;
2. a series of practical challenges (including access, time/capacity, and skills).

The diagram below provides more detail of the nature of these challenges and outlines factors that have the potential to overcome them. As we found in our discussion of approaches to knowledge production and transformation, many of these factors are currently 'aspirational' and are likely to require significant systemic change if they are to become reality.

Figure 4 Challenges and enablers in teacher use of external evidence

Challenges

Values, beliefs and priorities

External evidence is sometimes regarded as an ‘imposition on the professional autonomy of teachers’ (Levin, 2013, p. 20).
 Teachers’ views about the value of research can range from apathy on the one hand to cynicism on the other. Sometimes there is a lack of confidence in research and its currency (Dagenais *et al.*, 2012).
 Teachers lack receptivity to research findings where these conflict with their professional judgement (Levin, 2013; Campbell and Levin, 2012).
 Evidence use is often not viewed as high priority, or is perceived to be of low relevance (Bannister *et al.*, 2011; Fenwick and Farrell, 2011; Borg, 2010; Wilkins, 2012; Levin, 2013; Edwards, 2011).

Practical challenges

‘Information overload’ - difficulty accessing or finding research; and problems knowing what evidence to draw on (Sharples, 2013; Bannister *et al.*, 2011; Levin, 2013).
 Time or capacity shortage. Many teachers find the task of sifting through research to find what is relevant both daunting and time consuming (Haslam, 2010).
 A lack of teacher skill in interpreting or acting upon research findings (Levin, 2013; CUREE, 2011).

Enablers

Winning hearts and minds. There needs to be...

Serious effort to demonstrate to teachers the value of evidence. There is unlikely to be effective KMB without a professional will to use evidence to drive up standards.
 Teacher desire for professional autonomy to overcome the orthodoxy of government dictating on matters of pedagogy (Levin, 2013).
 A clear voice for the teaching profession on matters of evidence-informed practice, the value of evidence and strategies for using it.
 More focus on the value and role of evidence in ITT and CPD courses (Cochran-Smith and Lytle, 1993; Sharples, 2013; Goldacre, 2013; Wilkins, 2012; Geest, 2010) and in leadership training (Sharples, 2013; Levin, 2013; CUREE, 2011).

Practical solutions

Improved access to high quality evidence so that location is not a time consuming, burdensome activity for teachers.²²
 School leaders promote the value of evidence and provide appropriate resources. Effective leaders use evidence to inform decision making and prioritise professional development and organisational learning (CUREE, 2011; Campbell and Levin, 2012; Dagenais *et al.*, 2012).
 School partnerships can create opportunities for peer to peer learning (Enthoven and de Bruijn, 2010). They are strongest when they engage with evidence (GB. Parliament. HoC. Education Committee, 2013)
 Better ITT and CPD can support teachers to develop the skills to interpret and act on evidence (Dagenais *et al.*, 2012). Teacher engagement needs a culture of self and collective scrutiny and evaluation (CUREE, 2011).

²² Goldacre’s vision of a centralised knowledge base is the kind of systemic change that is likely to be required if this is to become reality (Goldacre, 2013)

The points above about ‘winning the hearts and minds’ of the teaching profession will not be easy to achieve. We know that teachers’ opinions and values about research are the most important predictor of their evidence use (Sharples, 2013; Dagenais *et al.*, 2012; Weston, 2013; Levin, 2013; CUREE, 2011). This suggests that those involved in knowledge production and transformation need to work hard to develop confidence in their outputs among teachers, and to develop systems that will enable schools to have quick, easy access to high quality evidence on the themes that they are interested in.

Teachers also need to be convinced that having a sound evidence base for pedagogical practice is a good lever for professional independence. The profession needs to believe that evidence use can ‘increase professional skills and discretion’ (Levin, 2013, p. 8). This is the situation in medicine, where the idea of governments interfering with clinical decision making now seems inappropriate:

Evidence-based practice isn’t about telling teachers what to do: in fact quite the opposite. This is about empowering teachers, and setting the profession free from governments, ministers and civil servants who are overly keen on sending out edicts, insisting that their new idea is the best in town. Nobody in government would tell a doctor what to prescribe ... I think teachers could one day be in the same position.

(Goldacre, 2013, p. 7)

But how might this be achieved?

- **First**, there needs to be a clear voice for the teaching profession on the importance of evidence-informed practice in supporting high quality teaching and learning, and in shaping the priorities for future research. The Association of School and College Leaders (ASCL), the National Association of Head Teachers (NAHT) and other unions fulfil this role to some extent, at present, alongside the National College for Teaching and Leadership (NCTL) and Teaching School Alliances. However, it is unclear whether issues around the value of evidence and its use are high enough up the agenda. Proposals for a Royal College of Teaching have the potential to mark a change in this regard (GB. Parliament. HoC. Education Select Committee, 2013, p. 34).
- **Second**, there should be more focus on the value and role of evidence in ITT and CPD, helping teachers to become ‘critical consumers’ of research. Cochran-Smith and Lytle (1993) suggest that ITT programmes should ‘introduce teachers to procedures for formal inquiry that can be used to improve and inform their work on an ongoing basis’ (p. 8). Integrating research into CPD can also be an effective approach for increasing a sense of the value of evidence (Sharples, 2013; Goldacre, 2013; Wilkins, 2012; Geest, 2010).
- **Third**, attention needs to be paid to courses at the other end of the professional spectrum such as the National Professional Qualification for Headship (NPQH) and other leadership training. Research shows us that where there is leadership support for the value of evidence; there is better teacher engagement and better delivery and implementation of interventions (Sharples, 2013; Levin, 2013; CUREE, 2011).
- **Fourth**, there is a need for more and better brokerage between the producers and users of research. Those involved in knowledge production and/or transformation need to develop confidence among teachers, and co-design systems that will enable schools to have quick, easy access to high quality evidence.

4.2 Approaches in knowledge use

The literature identifies a number of concepts and theories about the best means of teachers engaging with external evidence. However, we have found very few concrete examples of such approaches to evidence use in practice. We have again used Becheikh *et al.*'s (2009) models of evidence transformation to describe the few examples of teachers engaging with external evidence that we have found.

4.2.1 Research, Development, Diffusion



In this first example, teachers were involved in accessing, using and interpreting externally-produced research to inform their professional development or teaching practice. This is an example of a relatively 'passive' model of teacher engagement. Evidence was identified, accessed and presented by a third party – in this case a course tutor.

Box 4 – Research-involved CPD programmes

The 'researching effective CPD in maths education (RECME) project' was a large-scale research project funded by the National Centre for Excellence in the Teaching of Mathematics (NCETM). The project identified 23 'research-involved' CPD initiatives, explored the nature of research engagement within these and identified three categories of external research use. These were:

- Reading research literature (pre-selected by course leaders), discussing and interpreting the findings
- Using resources that had been developed as a consequence of research (for example pedagogies and didactics) in everyday practice
- Indirectly using research knowledge (conveyed by course leaders) to inform teaching practice - an example of an implicit use of evidence.

The teachers involved in research-involved CPD programmes reported that they prompted deep thinking; a desire to conduct further research into their own practice; and self-critique. One questionnaire respondent commented:

I feel much more motivated by CPD that is underpinned by research as I know that people have really tried things out with children rather than made something up and hoped for the best! [...] It makes me feel that I can justify my interest in the approach to those above me in the line management structure.

(Geest, 2010, pp. 68–69)

While this CPD approach had positive effects on teacher engagement, there is no evidence of the ultimate impact that it had on teachers' professional practice, or upon pupil outcomes.

Another example comes from overseas. While we have not routinely appraised international sources for this review, where UK-based evidence is found to be limited, we have looked elsewhere to see whether there are any useful examples. Generally, we have found little that

illuminates the UK-based evidence appraised for this review. In this example, however, three different models of evidence use have been trialled and evaluated for effectiveness. This is more than has been attempted in the UK. It is worth noting that the evaluation is based on a relatively small-scale self-completion questionnaire, however, rather than upon a rigorous trial.

Box 5 – Models and effectiveness of knowledge use in Canada

Three interventions were introduced into Canadian schools to improve school leaders' use of external evidence in developing their professional practice. These were:

1. Sharing high quality research reports and executive summaries on school improvement via a website.
2. Creating 'study groups' of six to ten school leaders to meet to discuss research (reports and executive summaries with the help of guiding questions) on school improvement. This is similar to the 'journal club' system that operates in medicine.
3. Creating opportunities for schools to conduct their own research, supported by a defined methodology and survey instrument.

Overall the three models were found to have only modest success. Just three of nine participating districts were able to move the interventions to any level of action. This was due to a range of well understood barriers related to time, capacity and priority. The findings from the analysis confirm that success varies widely across practice contexts. Not only is it difficult to implement interventions such as these, but even when implemented, they often have limited impact (Levin *et al.*, 2011).

One constraint of this research is that there is no *comparative* analysis of the relative effectiveness of the three different models, so we do not know which has the potential to have greatest impact on schools' knowledge use. This was inevitable given the small-scale nature of the study and the fact that only three districts fully engaged with it. A wider-scale trial seeking to explore the relative benefits of different types of approach to KMb (for example, dissemination-based versus interaction-based models) would be both valuable and timely.

4.2.2 Problem solving



One of Becheikh *et al.*'s (2009) models of evidence transformation is the 'problem solving' approach (where teachers identify their problems and use researchers as 'technicians' to help solve these). Edwards (2011) identifies two examples of teacher research engagement that come close to this model. These appear to be theoretical rather than practice examples however:

- **User-led research** – teachers are full members of the research team in collaboration with academics, and potentially set the research agenda themselves. They are involved in all stages of design, data collection and analysis.

- **Models of co-research for conceptual development** – researchers and practitioners work together to find a *shared language* to describe and evaluate the things that are taking place in practice. This means that researchers have to adapt their ways of working, and understand teaching practice (and its language) before discussing research approaches.

In reality, both approaches are less to do with a ‘use’ of external evidence by teachers, and more to do with a co-creation of evidence by teachers and researchers. We have been unable to find any concrete descriptions or evaluated examples of the problem solving approach within the literature. However, we do know that a number of organisations are currently developing programmes aimed at helping teachers resolve challenges and problems through the use of evidence. None of these programmes have yet been evaluated, but they indicate an increasing focus among research teams on supporting, and responding to the needs of, schools.²³

4.2.3 Linkage



The premise of the linkage model is that mechanisms are put in place (such as information sources, or people in the form of intermediaries) to assist the flow of evidence between producers and users, and its interpretation and use within schools.

Linkage agents receive the knowledge produced and disseminated by researchers. Then, they adopt and adapt this knowledge to practitioners’ conditions and context before disseminating it to knowledge practitioners.

(Becheikh *et al.*, 2009, p. 10)

Linkage agents, or ‘intermediaries’, need to have multiple skills. They need to be able to read and interpret research (including understanding methodology and having a broad overview of the literature). They also need to understand teaching practice and pedagogy, having a track record within both academia and practice and have an ability to translate complex materials into meaningful materials. Part of their role is also to help practitioners become competent in interpreting research findings (Cooper, 2010). Levin (2013) considers the roles of 40 intermediary organisations in Canada and notes that they fulfil eight main functions: facilitating linkages; increasing awareness of research findings; improving the accessibility of research formats; increasing engagement with research; influencing policy; building system capacity to use research; and offering implementation support.

As noted in Section 2, we do not yet have a systemic approach to intermediary support for evidence transformation in England. This is not to say that this does not happen on a piecemeal basis, but this review has been unable to find many specific examples of it in practice, although in the RECME project example described in Box 4, the CPD course leaders fulfilled this mediation role to a certain extent.

²³ See, for example: <http://eppi.ioe.ac.uk/cms/Default.aspx?tabid=3421> - The Institute of Education’s Research Advisory Service; <http://www.nfer.ac.uk/schools/enquiring-schools/> - NFER’s Enquiring Schools Service; and http://www.york.ac.uk/iee/working_with_schools/yipi.htm - The IEE’s Yorkshire Informed Practice Initiative (YIPI).

4.2.4 Social interaction



CUREE's review into practitioner use of research (CUREE, 2011) concludes that researchers have an important role to play in supporting teachers to contextualise their learning from external evidence. This is important both in examples of teacher engagement *with* and *in* research. In their review, they found examples of researchers supporting teacher training, providing ongoing feedback, and working collaboratively with teachers and schools to help them interpret external evidence for use in their own environments, to implement these and to monitor impact on pupils. The benefits of this approach are illustrated in the following example.

Box 6 – Why interaction may aid better interpretation of evidence

In the Adult-Child Interaction (ACI) action-research project, early-years practitioners drew on research or theory 'that might illuminate, explain or justify the project's emerging findings' (Fisher and Wood, 2012, p. 118). However, the authors of this report note that 'practitioners often modify new knowledge to fit with their existing beliefs' (p. 127). This illustrates two points:

- First, teacher engagement *in* research is likely to strengthen professional skills of enquiry meaning that teachers will be more critical when engaging *with* external evidence and may be less willing to accept it at 'face value' – essentially becoming more active and less passive (Saunders, 2010).
- Second, this makes a case for the benefits of a linkage or social interaction model over a 'science push' approach. Good understanding and use of external evidence is more likely to happen where there are collaborative discussions about interpretation, than where interaction with evidence is unsupported leading to 'flawed interpretations' (Wilkins, 2012, p. 68).

With the exception of these, and the examples provided in Section 3.2.3 and 3.3.3, we have not found any other examples (as distinct from theoretical outlines) of effective practice in social interaction for evidence use within schools. This leads us to reiterate the points that we have made in previous sections of this review that far greater understanding and evaluation is needed of:

- different approaches to knowledge transformation and use within schools
- the comparative advantages of one type of approach over another.

Comparative advantages need to be measured firstly in terms of the degree to which teachers engage with external evidence and use it to inform their professional practice, but ultimately in terms of the impacts that their engagement has on learner outcomes. Not only do we need to understand *whether* different approaches to KMB have positive benefits for pupils, but we need to understand more about why this is, and how it happens, so that the findings can be replicated more widely.

5 The role of teacher-led research and enquiry

The discussion so far (and indeed most of the literature on KMb) focuses on the best methods that research organisations can adopt when producing and transforming evidence and that teachers can adopt when using it. But we need to recognise that teachers are not just ‘users’ of research – they can be producers of research too (CUREE, 2011; Saunders, 2010). In this section, we consider the role and impact of teacher-led research and enquiry (teachers engaging *in* rather than *with* research). Section 5.1 discusses purposes, methods and enablers, while Section 5.2 looks at some approaches and their effectiveness.

Key findings and implications:

- Teacher-led research or enquiry is not a homogenous activity. It serves different purposes and uses a variety of methods. At its most effective, the methods used are closely linked to, and fit for, purpose.
- It can be conceived and established for different reasons: to inform a national knowledge base; to support school self evaluation or improvement; or to support individual-level professional development, for example.
- The methods adopted, and the factors that enable their success, are different according to the purpose of the research. Research or enquiry to support whole-school improvement is often broader in scope, for example, than individual class-level action research or reflective practice complementing personal professional development.
- The distinction between engaging *in* and *with* research can be overstated. Teachers undertaking research are often more disposed to engage with external evidence to support their enquiry than those who are not. The two processes are not mutually exclusive, and in the best examples, they complement each other.
- There can be an overemphasis on the development of teacher research skill as an end in its own right rather than as a means to an end (improved professional practice or better learner outcomes). Schools, collaborative networks, training providers and professional associations have a role to play here in defining the purpose of teacher-led research and enquiry and supporting best practice.

5.1 Purposes, methods and enablers in teacher-led research and enquiry

A discussion of the purpose and status of teacher-produced research tends not to feature to any great extent in the literature on KMb. However, there is a large amount of literature on the experiences of teachers undertaking their own action research or enquiry. Indeed, far more has been written in relation to factors that can enable teachers to conduct their own research than in relation to factors that can help them to access, use and implement

externally-generated evidence. This suggests that we have two parallel ‘research systems’ (and bodies of literature) in existence. It also raises three important questions:

- To what extent should teacher-produced research feed into the evidence ‘ecosystem’, along with researcher-produced evidence?
- Is this even the right objective for teacher-produced research? Should we assume that its goal is to feed into a wider knowledge system?
- Do we assume that teacher-produced research is automatically transformed for use in practice? There is little discussion in the literature about the outputs from teacher-led research, how these are used and mediated, and whether they help to inform a wider professional knowledge base.

Ultimately, these questions relate to a more fundamental question about **purpose**. Teacher research is not a homogenous activity. It serves different functions, comes in different forms and uses a variety of methods. Provided that there is a clear rationale for each teacher-led research or enquiry project, and that the nature and scale of that research are well suited to its purpose, then teacher research can be a worthwhile endeavour.

Figure 5 provides an illustration (not an exhaustive list) of the different ways in which teacher research can be conceived and undertaken. It also identifies factors that enable effective research engagement among schools and teachers in relation to their varying objectives. In each of these examples, the point at which teacher researchers engage with external evidence varies (CUREE, 2011):

- some engage with evidence at the start of their enquiry to help frame concepts and questions
- others use external evidence as a resource later on in the research process, possibly to contextualise their findings
- some choose not to engage with external evidence at all.

In a discussion about effective KMB, how concerned should we be about the final example?

Research suggests that ultimately, teachers engaging *in* their own research or enquiry are best served when they also engage *with* external evidence, as this maximises the relevance of their work (CUREE, 2011; Dagenais *et al.*, 2012).

Figure 5 Purpose, methods and enablers in teacher research

Purpose	Method	Enablers
<p>To inform a national knowledge base</p> <p>→ <i>system-wide impact</i></p>	<p>Take part in an externally-led RCT, or in a quantitative or qualitative research project exploring a particular strategy or initiative.</p> <p>Undertake local-level monitoring of an evidence-informed intervention.</p> <p>Teachers lead their own research and feed findings back up the 'chain' so that these inform a national knowledge base. Such findings might be especially useful in informing implementation.*</p>	<p>Scope for teachers' experiences of implementation to feed into the system, and for teachers to raise new questions for researchers to consider (Goldacre, 2013). This requires systemic change.</p> <p>Guidance for teachers on how to make findings public, supported by a system for doing so (Borg, 2010; Wilkins, 2012). Findings are most likely to be replicable where they emanate from a network of schools (Enthoven and de Bruijn, 2010).</p>
<p>To support school/consortium self evaluation or improvement²⁴</p> <p>→ <i>school-wide impact</i></p>	<p>Joint Professional Development (JPD) or enquiry-based continuing professional development (CPD).</p> <p>Often takes place via a collaborative partnership or a professional learning community.</p> <p>There is evidence that being involved in enquiry or action research provides more favourable attitudes to engaging with external evidence to support school improvement (Dagenais <i>et al.</i>, 2012).</p>	<p>External support (e.g. from LAs, academics or researchers, or via learning communities) (Borg, 2010; Casey, 2012; Dagenais <i>et al.</i>, 2012; Harris and Jones, 2012; Wilkins, 2012).</p> <p>Strong desire to use evidence to inform school improvement (Borg, 2010; Casey, 2012; Dagenais <i>et al.</i>, 2012).</p> <p>School senior leaders who support CPD and promote the value of enquiry (Borg, 2010; Geest, 2010; Wilkins, 2012).</p> <p>Research viewed as a form of professional development to be taken seriously (Wilkins, 2012).</p> <p>Member of school staff assigned with role of disseminating research among colleagues (Procter, 2012).</p>
<p>To support individual-level CPD/professional practice</p> <p>→ <i>individual impact</i></p>	<p>Research components of Masters or PhD qualifications.</p> <p>Small-scale, classroom-level enquiry or action research (sometimes with the support of colleagues) to improve personal practice.</p> <p>Reflective practice approaches.</p>	<p>School senior leaders who support CPD and promote the value of enquiry (Borg, 2010; Geest, 2010; Wilkins, 2012).</p> <p>Collaborative ethos and open, trusting culture (Borg, 2010).</p> <p>Rewards/incentives (e.g. accreditation; awards; recognition; career development) (Wilkins, 2012).</p>

* Many query whether this is a good use of teachers' professional expertise. Teacher-led research can be dismissed as small scale, anecdotal or non replicable (Borg, 2010; CUREE, 2011; Enthoven and de Bruijn, 2010; Wilkins, 2012). Additionally, even Masters' theses can fall short of providing the skills needed to conduct robust research (Borg, 2010; CUREE, 2011; Gray, 2013; Procter, 2012; Wilkins, 2012). There are also ethical considerations. Is it possible for a teacher to remain neutral while researching his or her students? (Wilkins, 2012).

²⁴ These are not the sole methods of supporting school self evaluation. Leadership Teams and governors are also likely to conduct a variety of activities including: monitoring visits, learning walks, scrutiny of pupils' work and analysis of pupil achievement data, all different forms of 'evidence'.

Perhaps it is helpful here to make a distinction between teacher ‘research’ and teacher ‘enquiry’. Teacher ‘research’ comes in a multitude of forms, but essentially involves some level of primary knowledge production. It can range from small-scale investigations or observations by a class teacher into the effects of a specific approach in his or her classroom, to whole-school (or indeed consortium-level) research into approaches and strategies for raising pupil achievement. But the distinctions between these activities are often blurred. Geest (2010) comments:

What is meant by ‘doing research’? For example, when does trying out new ideas in the classroom and reflecting on the effects of the changes become research? What are the boundaries between reflective practice and ‘doing research’?

(Geest, 2010, p. 71)

Part of the answer lies in the extent to which schools and individual teachers engage with the external evidence base when trying out new ideas and reflecting on their practice; and this is where a description of the process as ‘enquiry’ rather than ‘research’ becomes helpful. Enquiry involves engagement with a variety of different sources of evidence, information and expertise, and does not necessarily involve primary research (although it sometimes does). Enthoven and de Bruijn (2010) describe teacher enquiry as:

The process through which practitioners are able to systematically and intentionally explore information from [external] research, experts and each other in support of local decision making and problem solving.

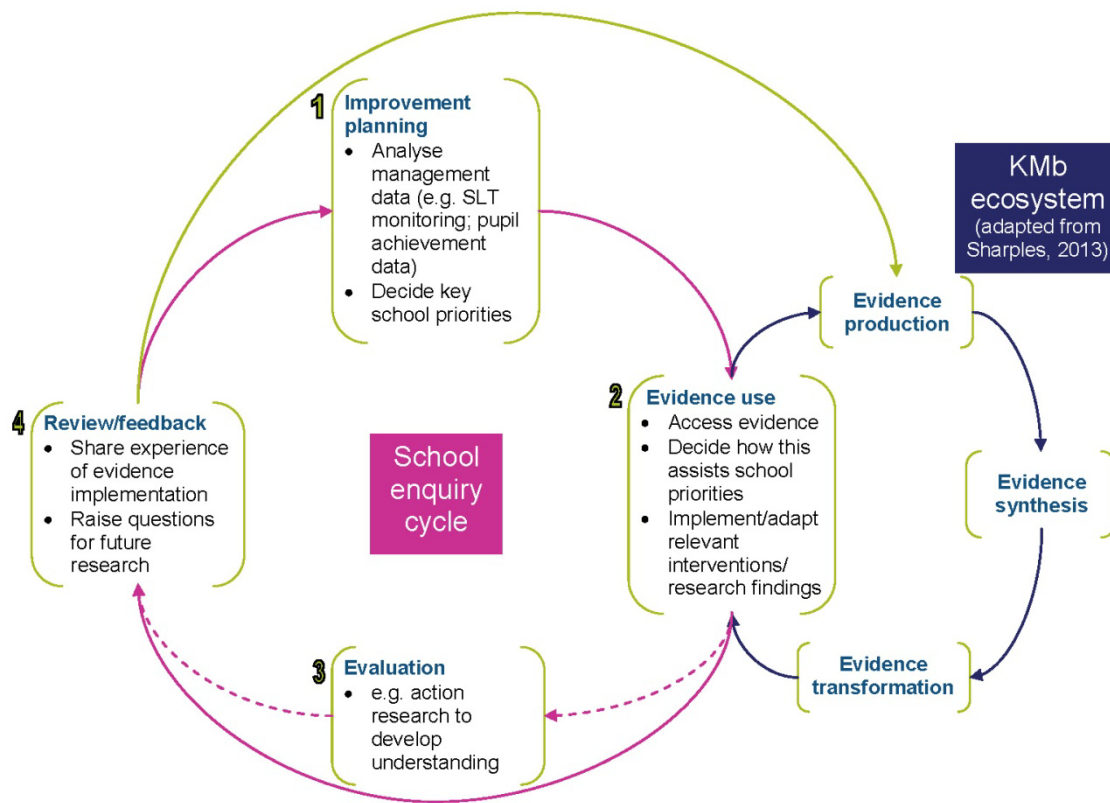
(Enthoven and de Bruijn, 2010, p. 294)

This suggests a process in which there is a fruitful interaction between external evidence, professional judgment and external pedagogical expertise in order to reach solutions. Such enquiry is most typically undertaken for the purpose of school self evaluation or improvement (see Figure 5) and flourishes where there is a collaborative approach (for example, a Community of Practice or a Professional Learning Community) often supported by external advisers or by specialist researchers (Enthoven and de Bruijn, 2010).

Figure 6 provides a visual example of the interaction between external evidence, and school enquiry. When reading this diagram, it is important to bear in mind the following points:

- Current approaches to school-based enquiry are currently no more systematic than are approaches to KMB.
- The school enquiry cycle ideally begins with improvement planning activities. Early engagement with evidence can help to shape and prioritise these ideas and activities.
- Researchers and teachers can work collaboratively at all stages in the school enquiry cycle – this is often positively beneficial.
- Research ‘production’ (through school-level action research) can form part of a school-led enquiry cycle, but does not have to. If the **purpose** of the action research is to inform school improvement, or to contribute to a wider debate, then it is best undertaken as part of a broader enquiry cycle.
- There is little current scope for teachers to feed their experiences of evidence use, and ideas for future research into the knowledge production system. A process enabling this could help to bring the interests of teachers and researchers closer together.

Figure 6 A process for research engagement



5.2 Approaches in teacher-led research and enquiry

There are many more examples of teacher-led research or enquiry than there are of strategies for mobilising external evidence within schools. These are summarised in the diagram below, and some specific examples are provided in more detail, as vignettes.²⁵ However, there are very few evaluations of the *relative effectiveness* of these different approaches and no apparent assessment of their impact on student outcomes. CUREE (2011), comparing the situation in education to the situation in health, notes that the reasons for this are, at least in part, related to the degree of importance attributed to knowledge use within the context of teaching:

Controversially, the repercussions of failure [in educational practice] are less immediate and dramatic [than in healthcare]. Pupils will not die from an experimental approach to teaching a particular subject – though in the long term their life chances may be seriously diminished.

(CUREE, 2011, p. 50).

²⁵ Many sources focus on the methods of research adopted by teachers, rather than on purposes of their research. As a result it can be difficult to establish exactly how approach relates to purpose. We have endeavoured to make the best judgements we can, but some approaches may be cross cutting.

Figure 7 Identified approaches in teacher-led research or enquiry

Purpose	Approaches/models
<p>To inform a national knowledge base</p>	<p>Externally led - Schools act as a test bed for researcher-led projects or trials (Geest, 2010; Edwards, 2011). Schools have little input into the design or analysis of the research, acting as ‘participants’. There are no published examples of this experience from the school perspective.</p> <p>Internally led – CARN, operational since 1976, produces tools, study days, conferences and a journal. It exists to enable teachers to lead the debate as producers (rather than users) of knowledge (Somekh, 2010). The National Teacher Research Panel (NTRP) fulfils a similar purpose (Wilkins, 2012).</p>
<p>To support school-level self evaluation or improvement</p>	<p>CPD model - initial training in research or enquiry topped up with ongoing support by a university; through residential events or tutorials (Geest, 2010; Percy-Smith, 2011) or remotely (Bevins <i>et al.</i>, 2011). Enquiry is typically closely aligned with organisational improvement priorities.</p> <p>Collaborative partnership model – within professional learning communities, teachers are identified as ‘lead enquirers’, often supported by a research coordinator or a steering group as ‘enquiry advocates’ (Wilkins, 2012; Fisher and Wood, 2012). The responsibility for the enquiry rests with the school.</p> <p>JPD model - Teaching Schools have a responsibility to develop practice across their alliances through the use of research (Sebba <i>et al.</i>, 2012). There are many ingredients for success in effective JPD, some of which include supporting the implementation of research through the network of schools and involving external researchers in helping to find answers to local-level questions.</p>
<p>To support individual-level CPD/professional practice</p>	<p>ITT model – ITT that contains an initial component on research interpretation and skills, followed up by independent research projects as an element of teaching placements (Gray, 2013; Stone <i>et al.</i>, 2012).</p> <p>MA model – teachers gain research training and undertake action research projects as part of their qualification. In one example, a six-year action research project was undertaken in which a team of teachers worked together and gained part accreditation for their respective MA degrees) (Wilkins, 2012).</p> <p>CPD model – similar to the example in the category above, but following initial training in research or enquiry, individuals undertake personal projects and reflective practice to develop their classroom practice (Casey, 2012; Geest, 2010).</p> <p>School-led model – schools with a long history of enquiry or action research provide secondment time or cover for members of staff to conduct their own enquiry (some of which contributes to MA accreditation). In these examples, school senior leaders usually have prior experience of using evidence or undertaking research themselves (Wilkins, 2012).</p>

The table above provides a very brief overview of some identified approaches to schools producing their own knowledge through research or enquiry. The vignettes below provide a little more information about some of these approaches and, where possible, discuss the impacts that they have had. It is important to note here that the evidence we have on effectiveness is typically based on observation or small-scale qualitative studies, and therefore is unlikely to be replicable. It provides a starting point for discussion however.

5.2.1 Approaches to informing a national knowledge base

Box 7 – Knowledge from the profession for the profession

CARN was founded in 1976 to: ‘bring together educators from many backgrounds and countries who share a passion for engaging in action research to improve teaching and learning and to create quality of opportunity for all young people and adults’ (Somekh, 2010, p. 105). The network encourages teachers to support each other to conduct research, so that teachers develop effective knowledge which they can use to influence educational policy and school reform.

This approach is very much about teacher-generated research influencing national knowledge and decision making. CARN supports its members to do this via conferences and study days, but there is no further indication of the ways in which the network shares or transforms its knowledge, or any evaluation of the impacts that its activities have had upon policy or practice.

CARN's approach is a potentially powerful one, and it would be fruitful to consider whether its messages and outputs have the potential to inform the knowledge syntheses that Sharples (2013) identifies as an essential component in a knowledge ‘ecosystem’ (See Figure 1). While CARN was established primarily to generate evidence from the profession for the profession, it is also worth considering whether it might be a useful vehicle for adding teacher-generated research to the wider knowledge base about ‘what works’ in education.

A similar case can be made for the work of the National Teacher Research Panel (NTRP). This independent group of teachers and headteachers, who work together to support and encourage other teachers to engage in and with research, offers opportunities for school-based researchers to interact through networks and to present papers at conferences. NTRP also supports school leaders to ‘read’ external research so that they are equipped to engage critically with new knowledge. NTRP was funded by GTC England, NCSL and LSIS until recently. It remains active, but there has been no evaluation of its activities or impacts. It would be interesting to consider the extent to which its activities and outputs might inform a wider knowledge base.

We can draw on discussions underway within healthcare to consider this further. Parkhurst *et al.* (2010) note the increasing importance of, what they term, ‘Getting Research out of Practice’ (GROP) relative to ‘Getting Research into Practice’ (GRIP). GRIP is a widely accepted model of knowledge use in healthcare (based on the implementation of interventions evaluated through formal trials); but GROP is increasingly being seen as the process by which *practitioners* decide the questions that need answering; develop interventions to help answer these; and undertake evaluations to ascertain effectiveness. Such an approach is feasible within education, but there is no current, coherent mechanism for such evidence to feed into a wider knowledge base. The arrow linking the school enquiry and KMb cycles in Figure 6 demonstrates how this information flow could occur in principle.

5.2.2 Approaches to supporting school self evaluation or improvement

Most teacher-led research is not designed to have an impact on national policy and practice however. Most commonly it is viewed as a mechanism for contributing to school improvement, or to personal professional development. In the following example, teachers undertook action research in order to improve their personal practice and to contribute to organisational development priorities.

Box 8 – CPD supporting school improvement

The University of Sunderland's Centre for Excellence in Teacher Training (SUNCETT) helps teachers undertake action research in order to improve their practice. All action research projects are: 'closely aligned with the improvement priorities of their organisation' (Percy-Smith, 2011, p. 3). The university provides tutorial support, residential visits and networking opportunities. In turn, teachers produce two reports and present the outcomes of their research at the annual LSIS conference.

An evaluation of SUNCETT's activities notes a number of benefits. These include: some teachers changing their practice and using different pedagogical approaches; increased knowledge and research skills among some; a more positive view of research across institutions; increased opportunities for collaboration; and the opportunity to disseminate research findings through conferences and journal articles (although there is no information on the extent to which the findings were transformed for wider consumption). There is also a small-scale qualitative assessment of the impact of teacher engagement in action research on learners which states that learners reportedly became more engaged in their lessons. The author of the study comments on the need to set up a longitudinal study to track impacts on learners over time however, in order to gain a more robust assessment.

A similar picture emerges through a qualitative evaluation of teacher research undertaken as part of CPD through the Science Learning Centres (SLC) network. Here, there are a number of reported benefits in relation to better professional reflection; better interaction with colleagues and external experts; and greater confidence in conducting research. There is no reporting of the impacts on learners, however (Bevins *et al.*, 2011). The same is true of the Adult-Child Interaction (ACI) project – a collaborative research project between early years' practitioners and a project coordinator. Here, participants reportedly developed deeper thinking and reflection skills (less so changes in their professional practice), but there is no indication of any ultimate impacts on learners (Fisher and Wood, 2012).

One potential limitation of action-research or enquiry-based projects such as these, is that they may focus too much time and energy on the development of research skills among teachers. There is clearly a need for teachers to develop some research interpretation skills so that they can confidently appraise research findings. However, the development of such skills should not overshadow the ultimate goal of using evidence - to improve practice, and ultimately learner outcomes.

Box 9 – JPD supporting school improvement

Connect to Learning (C2L) is an overarching JPD framework for facilitating collaborative learning and enquiry in teaching school alliances. The framework concentrates on changing pedagogy and professional practice as a route to improving learner outcomes. University researchers sometimes act as facilitators, but the teaching school leads the enquiry (Harris and Jones, 2012).

The authors comment that: 'The C2L methodology concentrates on changing pedagogy and professional practice as a route to improved learner outcomes. This relentless and continuous focus ... is at the heart of collaborative working. [...] It reinforces that without an impact on learners, collaborative working may have been enjoyable, stimulating and engaging but will have achieved little more than that' (p. 12).

This is an extremely important point. Kenny, in her submission on behalf of the Institute of Education to the Education Select Committee inquiry into School Partnerships and Collaboration (GB. Parliament. HoC. Education Committee, 2013, Ev 64), comments that collaboration is often advocated as an important means of schools learning from one another, sharing best practice and raising achievement. However, there is a lack of clarity about what this means in practice; little discussion of the positive benefits of collaborative working; and scant evidence of the relative benefits of different types of partnership approach.²⁶ Sims, in his submission on behalf of the NFER to the same inquiry makes a similar point: 'there is as yet no rigorous empirical longitudinal evidence that partnering has a positive impact on educational outcomes' (GB. Parliament. HoC. Education Committee, 2013, Ev 74). Kenny argues that where partnerships have enquiry or engagement with evidence at their heart, then they are often strengthened. They develop the capacity, for example, to consider why something worked in one context and how it might be applied in another.

The Select Committee has recently reported and has made an explicit recommendation based on this, and similar, evidence that: '...government embed evaluation into further initiatives relating to school partnership and collect systematic evidence of 'what works'' (GB. Parliament. HoC. Education Committee, 2013, p. 39).

Unfortunately, Harris and Jones (2012) do not report any evaluation of the impacts of C2L on learners, although this was reportedly the main focus of the collaboration. This reflects a major limitation in most current evaluations of teacher-led approaches to KMb. Some targeted evaluation work, specifically focused on measuring the impacts of teacher engagement in research on learner outcomes, would be a timely development.

²⁶ Steve Higgins and colleagues at the University of Durham have undertaken an unpublished review for the Sutton Trust on the role of partnerships in improving learning for disadvantaged learners. They identify four types of partnership: home/school; university/school; school/school; and school/extended services. Only home/school partnerships have been robustly evaluated in terms of positive connections with pupil outcomes (Higgins *et al.*, 2011).

5.2.3 Approaches to supporting individual professional practice

A number of the appraised literature sources are studies of teacher-led research projects that aim to support professional practice. There are a variety of examples of class-based approaches to teacher research or reflection, undertaken as part of ITT, CPD, or Masters' programmes, but only two studies that provide some level of evaluation of the effectiveness of these approaches. These are described below.

Box 10 – ITT supporting research for professional development

Stone *et al.* (2012), in their small-scale study of primary mathematics trainee teachers engaging with research, provide two case-study examples. The first trainee explored the benefits of using role play in mathematics teaching, while the second focused on children's perceptions of why mathematics might be important, and whether their views differed by socio-economic status. Both ran small-scale questionnaires with their pupils and used observation techniques. The first also undertook a literature review, demonstrating some engagement with external evidence. A similar study (Gray, 2013) considers the experiences of four trainee teacher researchers using research as a means of 'discovery learning' during their ITT.

Outcomes for the four Gray case-studies were evaluated qualitatively, by the designer of the course module, who found that: the teachers' position in school was enhanced; that there was an enhanced sense of need for enquiry and more openness to change; and that there were positive impacts on the trainee teachers' belief systems. Interestingly, the main aim of the research activity had been to improve their *research skills*, but the evaluation found that the model was ineffective in this regard, with all four students questioning the rigour of their own research (Gray, 2013). In the Stone *et al.* (2012) study, the two trainee teachers believed that the experience had helped them to reflect on their own practice by linking research with a 'real life' context.

In terms of the Gray (2013) study, one can't help but wonder whether the main aim of the research activity was poorly conceived. The positive finding is that the process of engaging with evidence (whether externally or internally generated) impacted on trainee teachers' belief systems; personal levels of reflection; and professional practice. This would appear to be a much more important and useful outcome for trainee teachers, than becoming experts in the conduct of research.

Box 11 – CPD supporting research for professional development

In this example, an individual teacher (Casey, 2012) embarked upon her own CPD journey by focusing on her specific classroom context and drawing on the support of colleagues to develop a 'learning community'. She used reflective diaries and observational techniques to develop better understanding of her pupils and her professional practice. She comments: 'There were no longer the barriers to professional learning experienced through a course – either its cost, location or the

effect it might have on my students'. While this teacher was able to discuss perceptions of impact upon herself, in terms of becoming more reflective and better at working collaboratively, she does not cite any specific results for her pupils.

In these examples of research-based approaches to developing individual professional practice, we should probably be less concerned about the nature of the research activity, or the extent of engagement with external evidence. The focus, after all, is personal development rather than school improvement or wider KMB *per se*, and small-scale research or reflective practice is likely to be just one of a number of approaches that teachers can embrace during their individual professional journeys. This brings us back to the comment made at the beginning of this section about the importance of ensuring that the rationale for teacher research, its nature and scale are all clearly linked to purpose.

CUREE (2011) identifies key characteristics of effective approaches in teacher knowledge production. They do not make a comparative assessment of the relative benefits of one approach over another; however it is interesting that most of their identified approaches recommend a **combination** of externally-produced evidence (or research expertise), with collaborative professional approaches to local-level enquiry. CUREE's models include:

- researchers providing theory, modelling new ideas and 'coaching' teachers;
- researchers offering support in identifying goals and research questions, then teachers working collaboratively to develop their enquiry;
- teachers and researchers working together to 'co-construct' enquiry and to interpret and implement findings;
- teachers working in collaboration with each other – team approaches are generally more effective than those where one teacher works in isolation.

Although CUREE identify the ingredients above, it is noteworthy that they were unable to find evidence of links between these approaches and student outcomes. Their findings are based on a judgement about what appears to lead to greatest teacher engagement, rather than on a systematic assessment of impacts on learners. This does not mean that approaches such as these do not have the capacity to have key impacts on pupils. Rather, it reflects that there have been few formal evaluations of the impacts of different approaches to teacher research engagement on learners. This is currently a substantial research gap, and an area that requires better understanding.

6 Topics for attention and action

Throughout this review we have identified a number of issues, challenges and approaches to developing a culture of evidence use within the teaching profession. In this final section we move from a summary of the evidence to consider four key topics requiring attention and action. These topics are presented below and discussed in greater detail in the following sections. We also propose some stakeholder-specific actions:

- Systemic issues and solutions
- The process of knowledge production, transformation and use
- The role of teacher-led research and enquiry
- The evidence base – what works and why?

Actions required:

- **Government** - has an important supporting role to play, for example by providing seed funding for some of the infrastructure required for a well-functioning KMb system. There are also arguments in favour of the development of an education institute for excellence similar to that that exists in healthcare.
- **Teacher representation bodies** – need to nurture the impetus for an evidence-informed teaching profession. Education will not become evidence informed if calls emanate solely from the research community or from central government.
- **Schools, collaborative networks, training providers and professional associations** have a role to play in brokering key messages including:
 - that the distinction between teachers engaging *in* and *with* research can be overstated. The two processes are not mutually exclusive, and in the best examples, they complement each other
 - that an overemphasis on the development of teacher research skill as an end in its own right is less helpful than teacher research as a means to an end (improved professional practice or better learner outcomes).
- **Research organisations and intermediary bodies** – need to transform (not simply produce, synthesise or summarise) evidence for practice – the importance of social interaction must not be overlooked in this process.
- **Funding organisations** – need to commission evaluations of different approaches to KMb. There is need for: better descriptions of varied approaches; evaluations of the *relative* benefits of different approaches (to aid comparative understanding); and impact assessments of the relationship between KMb approaches, professional practice development and learner outcomes.

6.1 Systemic issues and solutions

We have explored many views about the system changes that need to take place if education is to become a truly evidence-informed profession. These relate to various steps in a system of knowledge production, transformation and use and, at this stage, are largely aspirational (although there have been a number of positive developments over recent years).

It is fairly clear that system change will not occur without *coordinated action* across a number of areas, and some level of *leadership*, especially within the context of an increasingly decentralised education system where responsibility for the transformation of evidence for practice is dispersed and happens on a piecemeal basis. There are a range of organisations who could take such as lead. Some commentators call for government to take responsibility for overseeing such system change and creating the climate in which it can take place (Sharples, 2013). Government's ability to provide seed funding for some of supporting infrastructure needed, and to influence a variety of different parts of the system, certainly mean that is well-placed to play a role at least in the early stages. There are also comments about the desirability of instituting an organisation akin to the excellence institutes that exist in medicine and social care (CUREE, 2011; Dagenais *et al.*, 2012; Levin, 2013). A range of other organisations, representing both the research and teaching communities, would be well placed to take a lead in operationalising the various elements of such a KMb system, working either in partnership or independently.

It is very important that efforts to create an effective system to support KMb do not focus solely on the production, synthesis and transfer of knowledge, but also give a high level of attention to supporting an *impetus for knowledge use within the teaching profession*. There are currently a number of barriers to teachers' effective engagement with external evidence, the most fundamental of which relate to cynicism or apathy about the value and quality of externally-produced research (Dagenais *et al.*, 2012). There is a substantial job to be done in terms of 'winning the hearts and minds' of teachers if knowledge is to be effectively mobilised.

It is unlikely that this will be achieved if calls for system change and evidence use emanate solely from the research community, and for this reason, it is important that key influencers within the teaching profession seek to promote and support the use of evidence. A variety of organisations and individuals are well placed to do this including:

- Professional associations, teacher unions, teacher development organisations and leadership bodies (for example ASCL, the NAHT, ATL, NCSL and teaching school alliances). If a Royal College of Teaching, or similar professional representation body, is instituted in the future, there is potential, over time, for this organisation to lead the debate on evidence-informed practice.
- ITT and CPD providers.
- Informal teacher networks, such as the network of teachers involved in the recent Research Ed conference 2013.

6.2 The process of knowledge production, transformation and use

We know that KMB is not a linear process. Knowledge is unlikely to be effectively mobilised where there is a 'research push' approach focusing primarily on the dissemination of research findings to schools (however good the quality of the research or the channels of communication). Even good quality summaries or syntheses of research findings are unlikely to be used by large numbers of teachers to inform their practice. The evaluation of TLRP provides good evidence of this (Parsons and Burkey, 2011; Pollard, 2011).

If knowledge is to be effectively utilised by teachers, then it needs to be *transformed* for practice. This is only partly about converting research findings into teacher-specific resources and guides; it is also about the importance of social interaction between researchers and teachers (sometimes via intermediaries) to help mediate research messages, and to help teachers develop strategies for implementation, monitoring and review (Becheikh *et al.*, 2009). Evidence from the evaluation of TLRP shows us that there was greater impact on pedagogical practice where some level of social interaction took place (Parsons and Burkey, 2011).

The importance of social interaction does not apply only in the context of teachers' use of external evidence; it can also form a fruitful component of teacher-led enquiry into school- or class-specific approaches in which there is a bringing together of external evidence, professional judgement and external pedagogical expertise in order to reach solutions to local-level problems. In this context, researchers can play a number of important roles (CUREE, 2011):

- Providing theory, modelling of new ideas and offering coaching support.
- Supporting goal identification and formulating research questions to support teacher-led enquiry.
- Co-creating enquiry questions and approaches, and collaboratively interpreting and implementing findings.

Saunders (2010) reminds us that this is not an easy process. It is 'intense, messy and tough' and 'must be understood in terms of professional development – adult pedagogy – and resourced accordingly' (p. 20).

6.3 The role of teacher-led research and enquiry

There is a distinct lack of clarity in the literature related to KMb about the place and value of teacher-led research or enquiry – that is, teachers engaging **in** rather than **with** research. This is perhaps because most definitions of KMb adopt a primary focus on the mobilisation of externally-produced evidence: ‘data collected through systematic and established formal processes of enquiry from widely accepted bodies of empirical work, rather than from single studies’ (Cooper, 2010, p. 2)

It is also because teacher ‘research’ is often dismissed as small scale, anecdotal or non-replicable (Borg, 2010; CUREE, 2011; Enthoven and de Bruijn, 2010; Wilkins, 2012).

But this perhaps misses the point that not all teacher-generated research is undertaken with the intention of informing a national knowledge base or to inform local-level school improvement planning. Often it takes place primarily to aid individual professional development. And the distinction between engaging **in** and **with** research can be overstated. Evidence suggests that teachers engaging in their own research or enquiry are best served when they also engage with external evidence, as this reinforces the relevance of their work (CUREE, 2011; Dagenais *et al.*, 2012). Dagenais *et al.* also show that teachers who are involved in their own enquiry tend to be more disposed to engaging with external evidence. The two processes are not mutually exclusive, and indeed, in the best examples, they complement each other. This reinforces the messages in Section 5.2 about the importance of evidence producers interacting with teacher enquirers to both maximise the transformation of external evidence for practice and to support local-level processes of enquiry.

Other issues relating to teacher-led research or enquiry include:

- A consideration of whether there is scope for teacher-led research (such as that undertaken by networks such as CARN or the NTRP) to feed into a national knowledge system, and the process by which this can occur.
- The relative importance of the development of ‘research skills’ by teachers compared to the desired outcomes of their enquiry. In some of our case-study examples there was an overemphasis on the development of research skill as an end in its own right (see for example, Gray, 2013), rather than a view of the research as a means to an end – improved professional practice and/or better learner outcomes. As Harris and Jones (2012) point out: ‘without an impact on learners, collaborative working may have been enjoyable, stimulating and engaging, but will have achieved little more than that’ (p. 12).

6.4 The evidence base – what works and why?

Despite systematic searching to identify examples of different approaches to KMb, and their relative effectiveness, we have been able to find very few detailed examples, and even less evidence of effectiveness. This raises a number of issues for consideration:

- There are very few **published examples** of different strategies and approaches to producing and transforming knowledge for practice. There is a need for more documentation and analysis of the strategies that are being used to mobilise knowledge within and for the teaching profession.
- There is little evaluation of the **effectiveness** of different approaches in mobilising knowledge. Ideally, there is a need for research that considers the *relative* benefits of different types of approach (such as Becheikh *et al.* (2009)'s models) in order to achieve some degree of *comparative* understanding and to inform decisions about systemic developments.
- There is no evidence whatsoever about the ultimate impact of different approaches to KMb on **pupil outcomes**. We need to understand much more about the best approaches to mobilising knowledge in order to ensure that all existing and future evidence about effective educational practices is communicated to and through schools in the best ways possible.

Dagenais *et al.* (2012) encapsulate just how little is known about the nature and impacts of KMb approaches in practice. This is in spite of much authoritative work outlining the desirability of developing systems and processes to generate better evidence for practice:

Despite an increasing mobilisation of researchers and research-funding agencies, the literature on research use continues to yield little evidence on the processes involved, and even less on the effects of efforts to promote their use. [...] The extent of use and the dissemination of use ... sufficient for educational change to occur are still unknown.

(Dagenais *et al.*, 2012, p. 286 and p. 303)

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Appendix A Glossary of Terms

Engagement IN research

The process by which teachers undertake their own primary research projects to find answers to questions or to support teaching and learning, professional development or pupil progress.

Engagement WITH research/evidence

The process by which teachers access, appraise and use externally-produced evidence to inform teaching and learning, professional development or pupil progress.

Enquiry

The process by which teachers engage with externally-produced evidence alongside a range of other information and expertise (sometimes including primary research activities) to support teaching and learning or professional development.

Evidence

Data collated and synthesised through systematic and established formal processes in order to draw conclusions.

Evidence-based teaching/practice

Teaching practice or school-level approaches that are based upon the results of evidence about interventions or strategies that are effective in helping pupils to progress.

Evidence-informed teaching/practice

Teaching practice or school-level approaches that take into account the results of evidence about interventions or strategies that are effective in helping pupils to progress, alongside other sources of information, and professional expertise and judgment.

External evidence

See the definition of evidence above. Such evidence is produced by organisations external to schools, rather than by schools themselves.

Knowledge

Theoretical and/or abstract understanding of strategies that are effective in developing teaching and learning or helping pupils to progress, and practical understanding of how to put strategies into action. Knowledge, in this context, is acquired through engagement with evidence and sometimes other sources of information.

Knowledge mobilisation

The process by which evidence is implemented in practice, through synthesis, transformation into useful materials or guidance for schools, and/or mediation.

Knowledge transformation

The process by which evidence is converted from research outputs or syntheses into materials or guidance that are accessible for schools.

Research

The process of obtaining evidence about interventions or strategies that are effective in helping pupils to progress, either through the production of new evidence, or with reference to existing evidence sources.

Appendix B Search strategy

This section provides information on the keywords and search strategy for the databases and websites searched as part of the review.

All searches were limited to publication years 2010-2013, in English language only.

Literature was identified through:

- a search of relevant education and social science databases
- a search of relevant national organisation and government websites in the UK and internationally
- existing knowledge of publications and recommendations from experts
- a search of expert authors in the field
- reference harvesting.

Keywords:

Knowledge mobilisation	Evidence based learning
Knowledge transfer	Evidence engaged
Knowledge acquisition	Evaluation needs
Research access	Evaluation utilisation
Action research	Information utilisation
Teacher researchers	Research based practice
Practitioner research	Research based teaching
Practitioner involvement (research)	Research based learning
Reflective practice	Research needs
Enquiring professionals	Research utilisation
Enquiring practice	Research in practice
Enquiring schools	Research use
Research utilisation	
Evidence based practice	
Evidence based teaching	
AND	
Teacher	School senior leader
Education practitioner	School middle leader
Education workforce	Schools
Headteacher	Teaching schools

Free text searches were also run with these terms.

Databases searched:

Australian Education Index	Social Care Online
British Education Index	Social Policy and Practice
Education Resources Information Center	PsycINFO
IDOX	Pubmed

Database searches revealed a total of 252 relevant documents

Websites searched:

Association of School and College Leaders	Local Government Association
Association of Teachers and Lecturers	National Childrens Bureau
CUREE	National College for Teaching and Leadership
Department for Education	NAHT
EIPPEE	SSAT
Institute of Education	Teacher Development Trust
Ofsted	Teaching Schools Network
Learning and Skills Improvement Service	Teacher Training Resource Bank
Learning and Skills Research Network	

Website searches revealed a total of 52 relevant documents

Author searches

- Amanda Cooper
- David Gough
- Ben Levin

Appendix C Screening and synthesis strategy

Screening strategy

On completion of the literature searching (see Appendix B for search strategy and results), all of the identified items were uploaded into an excel spreadsheet and screened to make an initial assessment of the relevance of each item, based on its abstract. The screening criteria applied were:

- **Methodological robustness** - items based on randomised controlled trial (RCT) or quasi-experimental design (QED) data were prioritised, followed by items that discussed large to medium-scale quantitative or qualitative studies. Smaller-scale studies (for example of small numbers of schools or individuals involved in action research or KMb activities) were included where other, more robust, studies were lacking.
- **Content – priorities** – items that focused on factors that enable/hinder KMb, specifically in relation to:
 - teachers believing in the value of research/understanding research
 - teachers accessing research/evidence
 - teachers utilising evidence/research (putting findings into practice)
 - teachers conducting their own research or enquiry.
- **Content – models/approaches** – items that focused on practice examples of teachers accessing or utilising research/evidence, or teachers conducting their own research or enquiry.
- **Content – effectiveness** – items that focused on the degree of effectiveness of identified models/approaches (and why this is) in terms of teachers accessing or utilising research/evidence, or teachers conducting their own research.

Synthesis strategy

Once our 30 key items for review were selected and ordered, the review team began the process of appraising and synthesising the literature in preparation for reporting. We used a standardised template to capture key information related to content, methodology and findings, as well as applying relevance and robustness ratings to each source.

Once all items were appraised, the research team analysed the reviewed data in order to draw out emerging themes, patterns, and key messages. The synthesis was guided by the key research questions outlined in the introduction to this report.

We adopted a best available evidence approach to determining the weight given to each piece of literature within the review (the most weight given to the best, and most relevant, evidence).

Appendix D Assessing the strength of the evidence base

We appraised evidence on the basis of the following criteria. We were unable to identify many sources that were methodologically *strong*, with the majority of sources falling into the *moderate* or *subjective* categories. The evidence base relating to the impact of KMB approaches is considerably less robust than we would normally draw upon for a review of this nature. However, this has been identified as a finding in its own right, and caveats related to it raised throughout the report.

D.1 Strong evidence

Studies that are sufficiently large in scale (for example adopting adequate sample sizes to enable robust statistical analysis), or are based on sufficiently in-depth case studies to allow a full explanation of findings. Typically, 'strong' evidence includes:

- **Quantitative research** - complex statistical analyses of secondary datasets, or surveys of various stakeholder groups that have good sampling designs and large-enough samples to enable effective statistical analysis to be undertaken.
- **Qualitative research** - The most reliable studies are those that incorporate a number of in-depth case studies, across a number of locations, drawing on the views of a wide range of stakeholders, and 'triangulating' those views in order to assess the degree of agreement, or dissent, among different individuals.

As well as an item being 'strong' in its own right, the 'weight of evidence' is strong where there are a number of robust studies that concur in their findings.

D.2 Moderate evidence

The same types of evidence as above are included in this category. The distinction between a theme having a 'strong' or a 'moderate' evidence base is related to:

- **The weight of evidence** – themes with 'moderate' evidence are likely to have only a small number of (typically two to three) studies that concur in their findings. There may also be some studies that present a contradictory view.
- **The quality of evidence** – themes with 'moderate' evidence may include studies with small sample sizes, or qualitative studies that have drawn on the views of certain, but not a full range of, stakeholders.

D.3 Subjective evidence

As the title suggests, this category includes evidence that is based on the observation or opinion of those with an interest in the topic, or upon a case-study in one organisation only, for example. Very often, we find subjective evidence of one particular benefit within a study that was established to evaluate an entirely different benefit. Such findings cannot be dismissed entirely, but they tend to be anecdotal, impressionistic or descriptive in nature.

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- independent
- insights
- breadth
- connections
- outcomes

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**National Foundation for
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The Mere, Upton Park
Slough, Berks SL1 2DQ

T: 01753 574123
F: 01753 691632
E: enquiries@nfer.ac.uk
www.nfer.ac.uk

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