PERSPECTIVE

Evidence Matters:

Towards informed professionalism in education

Andrew Morris
with a foreword by Professor Charles Desforges

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Foreword

Professor Charles Desforges

> *Serial panic is no way to run a research agenda.*

This paper offers a straightforward recipe for achieving educational policy objectives whilst at the same time saving vast amounts of public money. The recipe can be illustrated by contrasting two stories. The first illustrates how we go about educational reform at the moment, how to spend large amounts of money, miss the goal and learn nothing. The second story shows how to surpass educational goals and save money. The detailed argument in Morris's paper shows how to move from the first story to the second story.

The first story concerns truancy and the failure of policy in this field. Truancy is bad news for truants. It is associated with low attainment, poor job prospects, poor health, crime and imprisonment. Some 70,000 youngsters play truant on any given day. Nearly three quarters of young offenders have truanted regularly (Goodall, 2005).[1] Truancy is bad news for us all. The cash costs alone are staggering. Costs include those related to the educational service, health service, social service and crime. It has been estimated that the average cost of a persistent truant is £45,000 or £800m per annum across all truants (NPC, 2007).[2] The challenge of truancy has been well recognised. Since coming to power the Government has spent £1 billion to tackle the problem but very little (if any) progress has been made. Across the system truancy rates hit a record high in 2007. Our £1 billion has failed to have an impact on the problem. Scandalously, we have not learned anything from the experience. Whilst it appears that there have been some successful projects essential lessons that might apply across the system have not been learned. We are in no better position to tackle the problem now than we were 10 years ago.

Contrast that story with a 'good news' tale. The Ministry of Education in New Zealand was concerned about reading standards in NZ schools. Whilst the average attainments were high there was a very long tail containing 20% of pupils. In 2001 the Minister commissioned a 'Literacy Leadership Project'. Twenty national facilitators were recruited to support head teachers in establishing a vision for new goals for school literacy and to set up classroom literacy projects (Timperley, 2007). All this was achieved (or 'put in place' to use the political term of art) but an evaluation showed that the work had had no effect on pupils' achievement. In fact the teachers were well pleased with the standards of their pupils as they were. The Minister took the evaluation very seriously and had the project re-designed to focus on pupil learning outcomes. Again a team of national facilitators was recruited but this time their role was to coach the teachers in promoting reading. This time the evaluators did not wait for the end of the project to assess its success/failure. They worked close up to the facilitators and quickly discovered that notwithstanding their training, they were less than proficient at their task. The facilitators themselves needed coaching on-site in order to apply the skills they had learned in training. When this was achieved the project ran its course. The impact on pupils' reading standards was staggering. There were huge gains across the board and especially so for the lowest 20%. The very worst of the readers prior to the project scored better than average in tests after the project. Students who were average readers before the project beat 98% of children not in the project.

What, apart from the obvious, is the big difference between these stories? The most fundamental difference is in the role that research played in shaping the successful strategy in New Zealand. In this case the research was deeply embedded in the project and provided swift and constructive feedback to key players. Added to that the key players, and especially those in the Ministry, had the wit and the courage to learn the lessons and act on them. Contrast that with research on truancy policy which in the main takes the form of surface evaluations usually offering up lessons about project management that are,

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[1] Goodall, E. (2005) *School's Out, Truancy and Exclusion*. London: New Philanthropy Capital

[2] NPC (2007) *Misspent Youth; the costs of truancy and exclusion*. London: New Philanthropy Capital

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"Researchers are lost in thought; practitioners are missing in action."

at one and the same time, well known from the outset and too late to make a difference.

The implication here is not to call for more research, less yet for more money for research. What is called for is a deeper consideration about the connectivity between research, policy and practice and between researchers and policymakers/practitioners. Amongst other things, practical working relationships are needed.

The educational research culture in England is well adrift from this position at the moment. Researchers are lost in thought; practitioners are missing in action. The culture is driven by funding. The biggest customer and the biggest spender is the Government. It drives the main research agenda; often it seems, by fixing research priorities from headline panics. Thirty years ago the big panic was about low levels of mathematic attainment so big research spending on maths teaching was the order of the day – to no evident effect. The panic

soon turned to literacy. Twenty years ago the panic was about girls' underachievement, then boys' underachievement, then ethnic minority underachievement and now white working class boys' underachievement. Sadly this last priority had been the priority before the serial panics set in. Serial panic is no way to run a research agenda.

Morris's paper faces up to all the above issues. It addresses the matters of research cultures, research priorities, research and practice and, above all, the potential impact of research on educational outcomes. The paper analyses where we are now (broadly illustrated by the above truancy story) and offers us a vision of where we can get to (see the NZ literacy story). Most valuable of all, it provides us with a road map for the way ahead. It should be required reading for anyone who wants to surpass current educational goals and save public money.

Professor Charles Desforges

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About the Author

Andrew Morris is an education consultant specialising in the interaction of research, policy and practice. As director of the National Educational Research Forum (NERF) in England until 2006, he worked with the chair, Sir Michael Peckham, on a programme of activity aimed at improving coherence in the way research was produced and used. He was previously a research manager at the Learning and Skills Development Agency, where he focused on capacity, methods and impact and led the Learning and Skills Research Network, a practitioner-led research programme and a practical research journal. Formerly he was a science teacher and senior manager at Islington Sixth Form Centre and City & Islington College. He is currently research strategy adviser to CfBT Education Trust and works with a wide range of other public, private and voluntary sector organisations.

Andrew Morris

Summary of key points

> *This summary introduces the key themes of each section of the publication to help the reader decide where to dip in.*

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The first section, *The way things are* outlines the need for evidence in education, where it comes from and how it is used. It suggests that evidence is needed by professionals and members of the public, in education as in other spheres but that demand for research-based evidence is not strong. It describes the range of sources of research evidence – academic, governmental, independent and practice-based – and points out the merits of such plurality. It also highlights approaches, methods and disciplines of potential value in education that are currently under-represented in the UK. It points to the explosion in information and knowledge available from research and calls for the development of better systems for organising it effectively for practical use.

The second section, *How things might be*, invites the reader to imagine what a future evidence-using culture might look like. It draws on existing small-scale innovations in education and larger-scale systems in other fields to set out possibilities. It suggests, for example, that a far richer variety of information and data might be made available, in handy formats, for use by practitioners and citizens. Materials used in classrooms and documents used for decision-making might routinely be grounded in research evidence; practitioners, managers and officials trained in using research evidence; scholarly enquiry and small-scale research a normal feature of school and college life. Above all, professional researchers and practitioners would interact as a matter of course to create and transform knowledge for practical use.

The third section, *Changes needed*, links the way things are and the way they might be, exploring the kinds of changes they imply. It distinguishes those of a fundamental kind, such as changes in thinking and in incentive structures, from others that are more procedural, such as the development of evidence-based tools for teachers. It calls for

a move in research production from a norm of short-term, detached projects towards larger-scale, longer-term programmes engaging directly with the development of practice. Such programmes would equip practitioners with guides to practice based on research evidence directly addressing the issues they face. At the same time some kind of central validating structure is suggested to protect practitioners and others from an uncontrolled flood of evidence and guidance from the multitudinous bodies that surround them. Changes in initial and continuing professional development to include the skills needed to access and appraise research evidence are suggested. Development of the brokerage function connecting the practice and research communities is urged and new incentives built into job roles in research, teaching, management and policymaking suggested to encourage the creation and exploitation of sound evidence.

The penultimate section, *Bringing about change*, proposes a reconceptualisation of the way in which applied educational research is funded, carried out and exploited. It draws inspiration from approaches familiar in other fields, such as design, in which the research task and the developmental task are not separated but simultaneously addressed in a constant iteration between the practice setting and the research base. An adaptation of the processes of 'technology transfer' is suggested, as an interactive approach to research communication in place of the prevailing one-way approach of dissemination. Reference is made to theoretical studies of evidence utilisation and examples of initiatives based on them.

The final section, *Key messages*, drives the issues explored earlier to some practical conclusions. It suggests that funders of research need encouragement to focus on fewer, larger, longer-term programmes that combine research with ongoing development activity and result in tools for the improvement of practice. At the same time funders of improvement programmes are encouraged to take account of existing evidence in the

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design of new programmes and to incorporate research strands to inform implementation and cope with changes in context as they arise. Local leaders in schools, colleges, universities, learning centres, local authorities and agencies are called upon to stimulate an evidence-using culture by encouraging the use of evidence-informed guidance, portals and networks and by creating spaces for groups of practitioners and researchers to re-think their roles in respect of each other. At the same time, changes are urged in professional development provision to equip practitioners to engage as professionals with the evidence base and to reward them for doing so.

1   The way things are

> *We would feel badly let down if our building surveyor were merely expressing her personal feelings about the prospects for our damp-proof course…*

People need evidence

In many spheres of life people are on the look-out for evidence, even though they may not see it that way themselves. One way or another we have to make choices about the tea we drink or the school for our child. Some go by experience, some by consumer advice and others look to their friends. It is, of course, a deeper question whether the kind of evidence adduced in these ways can be relied upon. Do we tend to favour evidence that supports what we wanted anyway? Were commercial interests influencing the consumer test? Was our friend biased in her passionate convictions?

In many parts of our lives we quite sensibly take it for granted that professional practices are based on sound evidence. We would feel badly let down if our building surveyor were merely expressing her personal feelings about the prospects for our damp-proof course or our social worker using his anecdotal experience to advise us about adopting a child. We may well ask whether this holds true in education. Is it generally taken for granted that educational practice is based on evidence? Is good teaching a kind of knack or gift? Does evidence play a part? What kind of evidence?

It comes as something of a surprise to discover that it is only recently that even medical practice has become 'evidence-based'. It is tempting to ask what on earth it was before! In the 1970s the concepts behind evidence-based practice came to prominence, the term 'evidence-based medicine' first appearing in the medical literature in 1992. As recently as 1995 a *British Medical Journal*[3] editorial claimed that

> *'The relation between science and health services has until recently been too casual. Ineffective treatments have been widely used, and medicine has been opinion rather than evidence based.'*

Careful trialling of treatment options has led to evidence-based guidance that has altered practices and saved lives. Similar trialling and development of evidence in the area of road safety recently led the Netherlands government to changes that resulted in a massive cut in child road deaths. The success has spurred that government to look at the potential of evidence-based approaches in education.

Of course the way in which evidence develops, is validated and gets used has varied enormously in different times and different fields. In some, like construction, solid evidence accumulates gradually over centuries as a result of practical experience; in others, like medicine or mental health, evidence develops around provisional theories, and gets revised in the light of experiment. However, even where convincing evidence does accumulate, it may still take an inordinate length of time for it to become routinely adopted, some studies suggesting that 10 years is not unusual. As professor Charles Desforges once pointed out at a teacher research conference: 'it has taken three hundred years for the medical profession to learn to wash its hands'; and, as hospital acquired infections continue to show, it is not there yet.

People need evidence about education

But are these indications from fields outside education helpful pointers to the potential of evidence in education? Are people really looking out for evidence in this field? Can it possibly compete with other influences on what people do and think?

Well, in principle, people certainly do seem to want at least some kinds of evidence. Many parents, for example, want to know, at some level, how they can best help support their child's learning and judge the qualities of different schools. Employers want to know how to recruit the right kinds of people and develop their capabilities. Local and national authorities want to know about effective ways of organising schools and colleges – what the evidence says, for example, about the size of secondary schools or the role of classroom assistants.

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[3] *BMJ* 1995; 311: 961–962 (14 October). See: http://www.bmj.com/cgi/content/full/311/7011/961

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Within the education professions there is a tremendous need for detailed pedagogic evidence – analogous to clinical evidence for healthcare practice. Teachers need to know just when to introduce a topic, how to integrate it with previous knowledge, when to work 1:1, when to switch to whole class, how to mark and feed back productively to learners, how best to put across a novel concept – and all this adapted for each subject area, age group and type of learner. Those who manage the work of front-line practitioners also need a constant flow of evidence. Their day-to-day decisions about timetabling and behaviour management call for detailed, tested evidence as much as their longer-term strategic decisions about setting, personalisation, parental engagement and so on.

Evidence is but one influence

Despite this apparently widespread need for evidence, education professionals do not seem to be expressing much demand for it. They have developed other ways of shaping their practice. Educational views are clearly affected strongly by personal and collective beliefs, for example in relation to the role of work, the nature of childhood, and the authority of religious scriptures. This is hardly surprising, nor likely to diminish, given the centrality of learning to the way we change and develop as children and adults. Similar deep influences are at work culturally, rooted in the processes for handing on (or not) norms from one generation to the next within a community.

Social and economic factors strongly influence beliefs about education. There may be a tendency to follow the actions of other like-minded people, for example in choosing a school or college course; and there may be strongly held views about economic value, for example on the relative merits of investing in a pharmacy or a literature degree. People's experience of previous similar situations, or of their neighbours' or cousins' experiences are powerful and often dominant influences in what people choose to do. In a meticulous study tracking the shifting thoughts of young people about their futures, Martin Bloomer and

Phil Hodkinson[4] showed just how influential these could be at the critical moments that shape people's learning careers.

From the citizen's point of view, educational evidence clearly has to contend with mediated opinion. Television and local and national newspapers dramatise government initiatives, build up or destroy school reputations and attribute values to particular academic subjects or forms of employment. For professionals, evidence competes for influence with central policy: targets set outside their control, inspection-driving notions of quality, regulation shaping the curriculum.

In the field of education, in contrast to health or social care, an additional factor diminishes the role of scientific evidence: the fact that we all have experienced it and feel personally competent to pass judgement about it. The limitations of such personal experience as a basis for judgement are of course plain: it will have occurred largely at a young age; social attitudes, curriculum design and pedagogy may well have changed since it occurred and it concerns learning, an intrinsically difficult cognitive task. Above all, our personal experience of schooling will have been particular – a small rural primary or a large urban secondary school – and hence unreliable as a basis for generalisation.

Despite this failure of evidence to play a dominant role in educational judgements, there remains in some areas an inevitable desire for maximum certainty, or at least for minimal risk. In choosing a school parents want information to be accurate, unbiased and useful; when selecting staff employers want firm evidence about their capabilities; when investing public money authorities want reliable evidence about the merits and costs of different options.

Research and policy

So there will be an inherent desire for some kind of evidence. A further demand for it may have developed in recent decades as a result of growing frustration over policy implementation. The apparent repeated failure to achieve policy targets in recent years may

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[4] Bloomer, M. and Hodkinson, P., 1997, *Moving into FE: The voice of the learner.* London: LSDA

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> *Further provision is needed in the sphere of civil government for the continuous acquisition of knowledge and the prosecution of research, in order to furnish a proper basis for policy.* (1918, the Haldane Report)

mean widespread public disillusionment adds a new twist to the history of evidence for policy. The demand for evidence to inform policy goes back a long way. In 1918 a report by Lord Haldane on the *Machinery of Government*[5] proposed, in the context of post-war reconstruction, that:

> *'Further provision is needed in the sphere of civil government for the continuous acquisition of knowledge and the prosecution of research, in order to furnish a proper basis for policy.'*

Following the second world war the sense of confidence about national reconstruction led to new approaches to welfare, town design, school and technical college organisation, among other things, based on a combination of scientific and political endeavour. The growing sense of the benefits of research linked to technology gave rise to a confidence about R&D during the 1950s and 1960s. In 1971 arrangements for organising and supporting pure and applied scientific research were formalised in a report by Lord Rothschild, *The Organisation and Management of Government R&D*[6]: government departments were to act as the informed customer and the research councils to be the contractor.[7] Twelve years later, however, a detailed analysis by Kogan and Henkel[8] concluded that the Rothschild formula

> *'failed to note how in those areas of policy where data are diffuse, and analyses most likely to be strongly influenced by value preferences, problems must be identified collaboratively between policymaker and scientist… policymakers have to work hard to identify problems, to specify research that might help solve them, and to receive and use the results of research.'*

Today the earlier sense of confidence about the value of positive, central intervention seems to be giving way today to a growing sense of

policy disappointment. Plateaus have been developing in previously rising indicators, such as GCSE attainments, and widespread publicity given to evaluations of failing interventions. It may be that recent initiatives have tended to 'cream off' the more easily solved problems (such as targeting potential grade D GCSE pupils to get them into the A–C band), leaving deeper ones associated with, for example, social polarisation and sustainability even more exposed. Others may well have been designed without recourse to sound evidence.

There are some who believe it is inherently unrealistic to expect the social sciences to produce the kinds of evidence demanded by educational practice. For some it is a question of scale and cost: controlled trials used in the development of pharmaceuticals, for example, are hugely expensive. For others, such methods are simply not appropriate for educational questions. For yet others, the issue is epistemological: knowledge itself is relative – irreducibly dependent on the perceptions of individuals and contexts of use.

This paper is predicated on the belief that these various doubts, important though they are, do not diminish the likelihood of steady improvement in educational practice arising from the consistent use of sound research evidence. In the field of education there are increasing grounds for this belief. In specific areas, evidence from diverse studies is accumulating and converging on some key points. In the area of assessment practice for example, the negative effects of excessive high-stakes, summative assessment are repeatedly confirmed and the possibilities of formative approaches continually developing. In science education, a growing body of evidence from the UK and abroad reveals how current curricula and pedagogies are failing to motivate learners throughout the developed world and indicate ways in which this might be reversed.[9]

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[5] Report of the *Machinery of Government* Committee, Ministry of Reconstruction, Cmd 9230, 1918. (The 'Haldane Report').

[6] Rothschild Report of *The organisation and management of Government R&D*, in *Cabinet Office, A framework for Government Research and Development*, London, HMSO, November 1971

[7] HMT 2006 http://www.hm-treasury.gov.uk/media/6/B/cooksey_review_background_paper_a_brief_history.pdf

[8] Kogan, M. and Henkel, M., 1983, in *Government and Research* page 6. London: Heinemann. ('Kogan and Henkel (1983)')

[9] Osborne, J. and Dillon, J., 2008, *Science Education in Europe*. The Nuffield Foundation

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"There is clear need to differentiate areas of education in which scientific evidence holds sway …from other areas in which political considerations are justly paramount."

What is noticeable in these and many other areas, however, is the gap between the scientific knowledge base and the political bases for the design of interventions. This is starkly exposed in topics such as high stakes summative testing and qualification design (in England) where a remarkable degree of professional and research consensus has not been reflected in policy decisions. There is a clear need to differentiate areas of education in which scientific evidence holds sway (as in the clinical aspects of healthcare practice) from other areas in which political considerations are justly paramount. Many pedagogic issues, such as assessment methodology, belong in the former category, whereas issues of the equitable distribution of resources, belong in the latter.

Where does evidence come from?

Evidence patently comes in many different shapes and sizes! One instructive list was offered in a seminar by Philip Davies, an expert in the ways of both government and universities.[10] He set out, in order of salience, his views on the kinds of evidence that senior policymakers tend to use in practice:

1. 'Expert' evidence (including consultants and think-tanks)

2. Opinion-based evidence (including lobbyists/pressure groups)

3. Ideological 'evidence' (party think-tanks, manifestos)

4. Media evidence

5. Internet evidence

6. Lay evidence (constituents', citizens' experiences)

7. 'Street' evidence (urban myths, conventional wisdom)

8. Cabbies' evidence

9. Research evidence

Whatever the evidential base of this informal ranking, it comes from a highly informed source and illustrates clearly the competition research evidence faces in policymaking.

In the world of colleges and schools much of the evidence used comes from sources close to hand, such as enrolment and performance data, inspection reports, observations of practice, reflections on experience and perhaps most frequently, conversations with colleagues. Research as a source of evidence seems to feature less, though its influence may be underestimated where it is indirect. A recent review for CfBT Education Trust states that

> *'A range of information sources seem to be important in communicating research to practitioners, including INSET, accredited courses, conferences, online databases and various kinds of publications. There is some evidence to suggest that teachers have a preference for research sources that are indirect and informal, such as research-based teaching materials and communication with colleagues.'*[11]

Much could be said about each of these many types of evidence. The focus for the remainder of this study however is firmly on the kind that derives from research.

Historically, education has been a field of research for many disciplines. Psychologists, for example, tackle issues of cognition, motivation, perception and memory; sociologists: the nature of groups, classes, institutions and societies; economists: the questions of investment and its pay-off in terms of jobs and productivity. Others such as historians, philosophers and anthropologists are concerned with how educational factors have influenced changes in nations and cultures over historical time. But it could also be that a far wider group of disciplines needs to contribute routinely to the field of education: geographers, for example, on migration, transport and urban development; architects on spatial design for learning communities; paediatricians and neurophysiologists on the neuronal and physiological aspects of learning. Sound knowledge about child development,

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[10] See seminar presentation at http://www.crfr.ac.uk/norface/reports%20seminar%201/Presentation-phildavies.pdf

[11] Morris A., Percy-Smith J. and Rickinson M., *Practitioners and Evidence*. CfBT 2007. Available online at http://www.cfbt.com/evidenceforeducation/Default.aspx?page=375

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> *…most practical problems do not emerge ready-made in the middle of existing research specialities.*

heredity, brain function, ageing, fitness, travel patterns, communication technology, business development and a host of other related topics is important for our understanding of educational processes as a whole.

Research in academic disciplines plays a number of crucial roles in generating evidence for education. By developing theory (or conceptual frameworks), generalisations may be made so that studies in one context can legitimately influence activities in another. This is essential in enabling studies to have large-scale influence on educational provision. Empirical studies, observation, recording and assessment of activity in the field help by providing models of what can be done in practice and information about success factors. Scholarship and debate enable insights and understandings to develop that throw light on complex situations. Each of these approaches contributes to sharper thinking and smarter action. The academic contribution to research is fundamentally important. It is not however unique.

The expansion and diversification of sources of knowledge has been analysed carefully in several seminal studies. In the case of the natural sciences, John Ziman[12] invokes the concept of 'post-academic science' to capture the manifold changes that have taken place in recent decades as industry and government impinge increasingly on research. He points out that:

> *'most practical problems do not emerge ready-made in the middle of existing research specialities. They are essentially transdisciplinary. This is a much more radical change than it may appear… Multidisciplinary teamwork challenges… personal autonomy, career prospects, performance criteria, leadership roles, intellectual property rights and so on.'*

In similar vein, Michael Gibbons and co-authors[13] introduce the idea of 'mode 2' knowledge production (in contrast to the more traditional 'mode 1') in which:

> *Problem solving is organised around a particular application…research groups are less firmly institutionalised…funding is assembled from a variety of organisations… different skills are integrated in a framework of action…sensitivity to the impact of research is built in from the start.*

These trends are reflected in education too: diversification in the forms of research, the funding of it and the range of participants. Public agencies evaluate the effects of their interventions to measure the return on investment or understand the effects of a policy direction. Practice-orientated research is developing, either as applied academic research, or as commissions from public agencies or directly in schools and colleges themselves. More coherent programmatic structures have begun to emerge in some areas, such as the ESRC Teaching and Learning Research Programme and the government-funded Research Centres that embrace and interlink multiple studies. Structures have begun to develop in a few schools and colleges to support participation in research.[14, 15] All these strands are important, not only for the development of new knowledge but also as part of the diffuse process by which knowledge is assimilated, distributed and put to work in the minds and actions of people.

Types of evidence

Taking the field of human knowledge as a whole, a vast richness of approaches has developed over the millennia for producing evidence. These range from systematic observation and analysis in anatomy and geology to the development of theory in thermodynamics and cognition; from 'field trials' in agriculture to longitudinal tracking studies in the social and health sciences.

[12] Ziman, J. *Real Science.* Cambridge University Press, 2000. pp 67–71

[13] Gibbons, M. *et al*, *The New Production of Knowledge*. Sage, 1994. pp 3–7

[14] Barker, P. *Research in Schools and Colleges.* NERF Working Paper No. 7.2. 2005. Available from http://www.standards.dcsf.gov.uk/nerf/word/WP7.2withappendix.doc?version=1

[15] Sharp, C. *Investigating the Research Engaged School* NFER, 2005. Information available from http://www.nfer.ac.uk/research-areas/pims-data/summaries/investigating-the-research-engaged-school.cfm

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> *Many subject areas in secondary schools and further education, for example, still lack a comprehensive, detailed evidence base to inform teachers about the merits and defects of specific teaching strategies for specific topics and specific types of learner.*

Any of the above approaches might, in principle, inspire research in education but in practice some seem to have been more emphasised than others. Prevalent approaches include analysis of 'administrative' data about students and institutions or social and economic data about their circumstances; statistical approaches probing the effects of social class, gender, ethnicity; perception surveys – of teachers and learners, parents and employers; evaluations of interventions and their impacts and scholarly analysis and critiques of policy to enable learning from experience.

Less common are 'experimental' studies that test out or compare alternative ways of dealing with a practical problem in various conditions, although they do occur in closely related areas such as sex education, learning theory and nutrition. Longitudinal approaches are also relatively under-used. Although data collected over people's lives in the major cohort studies are now actively analysed in relation to education, there is potential for greater use of longitudinal tracing of the effects of specific educational interventions as learners move from one phase of learning to another.

The imbalance in methods used in educational research is regularly exposed in systematic reviews of evidence on key problems in education. They frequently reveal a paucity of rigorous studies capable of separating out the effects of multiple influences, in contrast to a relative richness of studies focusing on policy analysis, stakeholder perceptions and broader issues of less direct utility for classroom practice (though, interestingly, these remarks do not hold true for studies in the USA). In general terms it is the integration of research with development on pedagogic problems that is so under-represented in education. Many subject areas in secondary schools and further education, for example, still lack a comprehensive, detailed evidence base to inform teachers about the merits and defects of specific teaching strategies for specific topics and specific types of learner. Guidance to teachers on effective methods of teaching particular topics frequently relies on views about good practice rather than on trials, and rarely offers any measure of the

relative strength of any particular influence. In some contexts, such as vocational learning for example, detailed pedagogic R&D at topic level barely exists. In a few areas, however, fortunate funding and policy pressures have led to R&D programmes on specific pedagogic practices – literacy and numeracy being examples.

So in education a relatively limited range of approaches, methods, disciplines and sources of information seems to be called into play. Is this is a consequence of the low level of funding for educational research generally,[16] or does it perhaps reflect particular skills shortages in R&D, or is the field of education lacking sufficient attention from leading economists, sociologists, psychologists and others who have choices about where to apply their skills and theoretical frameworks? Do other fields – transport, social care or housing – prove more attractive? It would be interesting to see a careful analysis of the range of disciplinary inputs to educational research compared to other fields.

Quantity and quality of evidence

The 'amount' of evidence available in education is difficult to quantify – some say there is precious little, others vast amounts. Which is true depends much on what is under consideration. For specific curriculum areas and types of learner, for example, there is insufficient detailed, robust evidence for practice about the effectiveness of differing pedagogic approaches. On some key broad issues, however, such as the effect of frequent, high-stakes, summative testing there is considerable weight of evidence. The frustration in the latter case is less with the quantity of evidence, more with bringing it to bear in the public-political arena. Similarly, the overwhelming quantity of material sent to schools and colleges, some purporting to be evidence-based, is a reflection less of the *quantity* of evidence, more of the absence of any central mechanism for selecting, distilling and synthesising it prior to use.

The quality of educational research has been the subject of extensive, and sometimes rancorous, debate in recent decades. Some

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[16] OECD Review: *Educational research and development in England.* OECD 2002 p8

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"It would certainly be interesting to see a serious study of what educational practitioners and policymakers consider to be the kind of research evidence they need…"

believe that particular forms of research, such as randomised controlled trials and other forms of experimental study are needed to provide an evidential basis for recommendations about particular practices. The *Best Evidence Encyclopedia* in the USA, for example selects reviews that 'focus on studies comparing programs to control groups, with random assignment… and summarize program outcomes in terms of effect sizes'. Others believe such restrictions are damaging insofar as they discount the contribution of qualitative studies in illuminating the social interactions involved in learning. A recent issue of the *International Journal of Research & Method in Education* was given over entirely to the question of quality and provides an overview of the main arguments.[17] The question of whether there is little evidence or not, hinges therefore on which view you take. It would certainly be interesting to see a serious study of what educational practitioners and policymakers consider to be the kind of research evidence they need and which assesses the quantity that stands up to their requirements for quality and usefulness. Anecdotally, a frequent complaint, at least in post-compulsory education, from people undertaking reviews of research is that there is little trustworthy evidence available on issues relevant to practice.

Managing knowledge

Information overload

Apart from the questions of how research is carried out and evidence made available, there are the increasingly prominent issues of how people actually make use of it. The enormous explosion of information is a well-established issue affecting all areas of life and science. Traditional methods for accumulating and transmitting knowledge are clearly inadequate to cope with the supply, and new information technologies offer interesting new opportunities. In the past research knowledge has tended to accumulate in specialised centres of expertise and be transmitted through person-to-person relationships (between, for example, doctoral students and supervisors), journal articles, research reviews and databases. This process is no longer

adequate: there is too much information, too many specialisms and the turnover is too fast. At the same time, expectations of evidence are rising. More types and numbers of people need to make use of it – policymakers, managers, practitioners, journalists, civil servants, politicians and researchers in other fields; and the ways in which they wish to encounter it are increasingly varied. This puts pressure on the producers of knowledge to diversify the forms in which it is prepared for use. Amongst research organisations seeking to influence policy and practice, it is increasingly common to find information organised into executive summaries for the one-minute reader, statements of implications for policy and practice managers and topic reviews for the commissioner.

Evidence Centres

But even in cases where knowledge has been organised for use by diverse kinds of user it often remains stored, and sometimes locked up, in places known only to the producer. Important kinds of knowledge are not readily accessible to busy people in front-line practice and decision-making. Even where it is publicly available potential users cannot be aware of the multiplicity of sources from which they might benefit nor would they have time to traipse through them all if they did. They need a single place where evidence from multiple sources is brought together and organised for use. But this will not suffice: evidence for practical use not only needs to be brought together, it is also needs to be sifted, classified or, even more importantly, assessed for quality and relevance. It is in this area that education is so clearly lagging in relation to the health and social care areas of public life. Structures such as the National Institute for Health and Clinical Excellence (NICE) and the Social Care Institute for Excellence (SCIE) have become major public resources providing the professions with sound evidence, properly assessed and classified. Similarly the Cochrane Collaboration has pioneered standard setting for systematic reviews of evidence and other initiatives, such as the *Effective Healthcare Bulletins* and developed methods for condensing and communicating information for busy practitioners.

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[17] *International Journal of Research & Method in Education*. Vol 30 no. 3 2007

In education, proposals for comparable structures were developed and put forward to government by the National Educational Research Forum in 2003[18] and 2005.[19] They imply the need for more sophisticated ways of managing knowledge: classification systems to categorise it and methods for describing quality in appropriate ways for the field. Important groundwork has been started on this. A working party, including members from SCIE and NICE, has outlined the nature of such a Centre and a survey shown that stakeholders would welcome it. At the same time our understanding of quality in educational R&D has advanced and broadened through a seminal study for the ESRC[20] and methods for reviewing and synthesising findings systematically and cumulatively are developing. (See Box 1 below.)

The issues raised above are by no means new. Many leaders in policymaking, the teaching profession and academia have been asking whether better evidence and better utilisation of it could lead the way to serious and lasting

BOX 1:	**Evidence Centres**

National Institute for Health and Clinical Excellence

NICE is responsible for providing national guidance on the promotion of good health and the prevention of ill health, on the use of new and existing medicines, treatments and procedures and on treatment and care of people with specific diseases and conditions. It develops guidance using the expertise of the NHS and the wider healthcare community, healthcare professionals, patients and carers, industry and the academic world. Online guidance is searchable by type, topic and date and guidance has also been developed for service managers on effective methods of *implementing* practice guidance.

Social Care Institute for Excellence

SCIE was established by government to identify good practice and helping to embed it in everyday social care provision. It disseminates knowledge-based guidance, involves service users, practitioners, providers and policy makers in advancing and promoting good practice and enhances the skills and professionalism of social care workers through its user-friendly resources. It provides online practice guides, practical tools, e-learning tools, an online database, brief summaries of existing research and detailed reviews of existing knowledge. Its audience is frontline workers and managers, commissioners, educators and trainers, policymakers, students, service users, carers and their representative bodies.

An Evidence Centre for Education?

An Evidence Centre was proposed by the former National Educational Research Forum to make evidence accessible to all involved in education – lay and professional. It would draw together evidence from a wide range of sources and provide guidance on assessing and using it. A working party recommended that it should work in partnership with organisations already offering support and guidance for practitioners using evidence, acting as a centre for the accumulation of research evidence reliable enough for national application.

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[18] *NERF strategic proposals.* NERF Working Paper 3.1 (2003). Available from http://www.standards.dcsf.gov.uk/nerf/word/WP3.1Strategicpropfinal.doc?version=1

[19] *A National Evidence Centre for Education.* NERF Working Paper 4.1 (2005). Available from http://www.standards.dcsf.gov.uk/nerf/word/WP4.1NECEfinalreport.doc?version=1

[20] Oancea, A. and Furlong, J., *Assessing Quality in Applied and Practice-based Research* (2005). Available from http://www.bera.ac.uk/pdfs/Qualitycriteria.pdf

> *The use of the results of educational research in policy and practice can be successful only if a 'revolution' can be brought about in the attitudes and perspectives of the various stakeholders.* (OECD, 1995)

improvements in educational provision. A fundamental study by Maurice Kogan and Albert Tuijnman for the OECD in 1995[21] described problems in educational research on a worldwide basis. It expresses in particular the doubts of practitioners and policymakers about its usefulness and relevance and analysed the relationships between the key stakeholders. Stating that:

> *'The use of the results of educational research in policy and practice can be successful only if a 'revolution' can be brought about in the attitudes and perspectives of the various stakeholders.'*

it called for 'policy systems to be critical performers in setting the research agenda, researchers to produce results reflecting scientific theory, practical insight and policy constraint and practitioners to join the other two groups in the quest for usable knowledge'. At an OECD conference 10 years later one of the authors decried the worldwide failure to act with any sense of urgency over the decade that had passed since then. More recently, at an EU conference 'Knowledge for Action', convened by the Germany presidency in 2007 the keynote speaker, Ben Levin, called for more working across boundaries, more thinking through of ideas, more learning about how to involve third parties effectively and more effective coordination of plans and production of tools for teachers.[22] A concurrent study for the European Commission in 2007 resulted in a Staff Working Paper[23] which reiterates the 'lower impact on policy and practice of educational research compared to other policy fields such as social care and employment policy' but goes on to note 'evidence of efforts to enhance it through increasing relevance, broadening involvement and improving quality'.

Knowledge utilisation – initiatives

So there seems to be no shortage of good analyses of the problem; what of the initiatives set up in response to them?

Developments in evidence utilisation have moved on apace in several countries. In the United States, for example, the *What Works Clearinghouse* brings together and assesses evidence from studies meeting a defined standard (randomised field trials, regression discontinuity studies and quasi-experiments) and the *Best Evidence Encyclopedia* offers 'meta-analyses and other quantitative syntheses that meet high standards of methodological quality and evaluate realistic implementations of programs'. In the UK, the EPPI Centre carries out research synthesis, develops review methods and makes reliable research findings accessible to the people who need them through a public database of its reviews. Other repositories are available in a number of countries, notably Canada, Australia, New Zealand and several European countries.

To begin to make sense of these stores of knowledge a number of search tools have been developed for different kinds of user. These tend to follow the possibilities opened up by the fast-changing world of electronic search technology. Google has itself developed a scholarly version of its search engine, *Google scholar*; the ESRC has created the *Society Today* portal, which enables the vast range of its studies to be searched. More specifically, the *Educational Evidence Portal* is being developed in the UK as a step on the path to the Evidence Centre envisaged by the National Educational Research Forum. It enables evidence-based documents to be reached, drawn from multiple sources of interest to the busy user. Interestingly, the portal is developing, not as a top-down initiative of government or any other single agency but through a bottom-up network of organisations, spanning government, academia and practice, led by an independent charitable trust, CfBT. A website, *The Research Informed Practice Site,*[24] developed by the Department for Children, Schools and Families (DCSF), provides versions of key studies rewritten for use by teachers, whilst the

[21] *Educational Research and Development: trends, issues and challenges.* OECD, 1995.

[22] Levin, B. keynote speech, EU conference, Frankfurt. March 2007. Available online at http://www.bmbf.de/en/7245.php

[23] *Towards more knowledge-based policy and practice in education and training.* European Commission, Education and Training DG, Brussels. 2007. p 26. Available online at http://ec.europa.eu/dgs/education_culture/publ/pdf/educ2010/sec1098_en.pdf

[24] See http://www.standards.dcsf.gov.uk/research/

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Teacher Training Resource Bank, developed through the Training and Development Agency, provides evidence-based resources for teacher educators and their students. (See Box 2 below.)

Networks are a key feature of the evidence-using landscape. Various bodies are using them to support teachers in the use of evidence – for example the General Teaching Council's network of CPD professionals. Other networks engage practitioners with research and evidence, for example: the Learning and Skills Research Network and the Higher Education Academy networks. (See Box 3 below.)

At the same time important studies are becoming available that extend our understanding of the processes underpinning these initiatives. New approaches to synthesis are being developed by the ESRC Methods for Research Synthesis programme and scholars such as Pawson.[25] Studies of practitioner engagement with research have been undertaken recently by the National Foundation for Educational Research on the

BOX 2:	**Evidence-based resources for teaching**
	The Research Informed Practice Site The website offers easy access to essential research findings for teachers, governors, parents and all those who support them. It aims to help make sure that practice and policy in schools, and at a regional and national level, are informed by good and up-to-date evidence. It provides accessible digests of research, which use plain language and clear illustrations; and looks at some of the implications for practitioners. **The Teacher Training Resource Bank** TTRB is a project supported by the Training and Development Agency for Schools which aims to make the Initial Teacher Education (ITE) professional knowledge base more easily accessible; increase the quality and range of ITE resources available and promote and effect change by supporting tested knowledge transfer and adoption strategies. It enables searching of selected resources and provides personal support via an e-librarian.

BOX 3:	**Networks**
	The Learning and Skills Research Network brings together people involved in producing and making use of research in the learning and skills sector and higher education and provides a welcoming atmosphere for those new to research. It holds conferences and meetings and undertakes projects in some regions. The *GTCE Connect network* brings CPD coordinators, advisers and leaders in the schools sector together to share, stimulate and support good practice in leading professional learning. It provides access to research and resources on supporting teacher learning. The *Higher Education Academy* has formed many networks to enable collaboration; share good practice, and disseminate activity and research in higher education. There are specific networks for each subject area and for those involved in research.

[25] See, for example, *Research Synthesis: an introduction*. Pawson, R. *et al.* 2004. ESRC Research Methods Programme. Available at http://www.ccsr.ac.uk/methods/publications/documents/RMPmethods2.pdf

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> *A central body of sound evidence is needed from which policymakers and practitioners can draw **before** they encounter problems in implementing change.*

Research Engaged School,[26] by National Educational Research Forum on research in schools and colleges[27] and by CfBT Education Trust on how practitioners engage with evidence.[28]

Evidence initiatives in teacher training and professional development have been organised by the TDA through, for example, its Teacher Training Resource Bank and e-librarian service and the GTCE through its Teacher Learning Academy, which recognises and accredits teacher learning. These are important steps towards the kind of higher level, research-informed concept of initial teacher training such as that seen in Finland.

The state of play

So from this bewildering array of issues and initiatives, what might be usefully said about the overall state of play? In summary:

(i) *Research outputs are not well organised.* There are large quantities of unclassified, unsifted information available that are barely being used because potential users cannot readily access them. Amidst this information is some useful knowledge; some sound knowledge and some relevant knowledge, mixed with much that may be neither of these.

(ii) *An evidence-using culture has yet to develop in education.* Across the communities of practitioners and decision-makers there is widespread uncertainty about the value of research evidence for improving things on the ground. Some of this may be groundless and some justified.

(iii) *The range of methods used to create educational evidence is too limited.* Too little evidence is based on trials or experiments in which key factors are isolated by randomisation or other means and longitudinal elements are too rarely incorporated into research designs.

(iv) *Apparatus for transforming research evidence for use is too small-scale.* Too little of the potential usefulness of existing research findings has yet been exploited. Methods for synthesising findings from multiple studies need to be developed further as a basis for guidance for practitioners.

(v) *Policy interventions are insufficiently informed by research evidence.* Research is not routinely integrated into the design and implementation of interventions at both national and local levels.

(vi) *Evidence about effective use of evidence is growing steadily.* Recent studies of how evidence is used reveal the importance of social processes and interaction between stakeholders.

(vii) *Investment in educational R&D remains too low*, especially in relation to the significance of its effects. This results in studies that are too small-scale and insufficiently robust.

(viii) *There is insufficient knowledge about what works* in the specific micro-situations that learners and teachers actually find themselves in.

Conclusion

More widespread use of evidence is required in education; the benefits of evidence-driven approaches demonstrated in other fields provide useful learning points. Within education, innovations and initiatives could be built upon to develop more widespread professional use of evidence. The certainty needed by decision-makers depends on establishing a pattern of results replicated in multiple independent studies and on secondary work to classify, sift and synthesise findings for practical use. A central body of sound evidence is needed from which policymakers and practitioners can draw *before* they encounter problems in implementing change.

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[26] *The Research Engaged School*. Sharp, C. *et al.* NFER (2006–07) see. http://www.nfer.ac.uk/research-areas/research-engaged-schools/

[27] See *Research in schools and colleges*. Barker, P., NERF Working Paper No. 7.2 2005. Available from http://www.standards.dcsf.gov.uk/nerf/word/WP7.2withappendix.doc?version=1

[28] *Practitioners and Evidence*. Morris, A. *et al.* CfBT working paper, 2007. Available from http://www.cfbt.com/evidenceforeducation/Default.aspx?page=375

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2   How things might be

> *How might we begin to develop scenarios for a future evidence-using culture in education?*

Introduction

Having set out some thoughts about current issues in evidence-for-education we now pause before considering possible changes. We look speculatively at what a future evidence-using world could look like in education, to help us think more strategically about reform.

How might we begin to develop scenarios for a future evidence-using culture in education? Two starting points spring to mind. First there are the exemplars provided by the many initiatives currently taking place, albeit on a small scale, and in specific contexts. These tackle bits of the jigsaw and provide insights into what could be happening on a larger scale, in the mainstream. Second, there are developments in sectors outside education, which provide inspiration and possibly models of how things could be. Such models may well not transfer directly into education; their value lies more in the lessons to be learned from their pioneering experience – they help us imagine the options that lie in store and the kinds of adaptation that might be appropriate for education.

The front-line practitioner

Day-to-day use

People who come into direct contact with learners on a daily basis – as teacher, coordinator, assistant, mentor, adviser, supporter, guide, librarian or technician, for example – have perhaps the most need for an evidence base to inform their practice. Yet paradoxically they are perhaps the least likely to have time for, awareness of, or access to one currently. In present circumstances it is unusual to see research evidence routinely applied in a direct way to day-to-day matters such as teaching plans, marking schemes or parent communications.

Reference material

Yet many other kinds of professional – doctors, engineers, architects, lawyers, for example – *are* equipped with relevant evidence for daily use. There are concise reference materials in which evidence about details of practice is codified, accessible, understandable and relevant; there are useful evidence-based tools that help guide them through daily procedures. (See Box 4 below.)

Would such resources be useful for front-line teaching? Some would say yes – after all, bodies such as subject associations and government-linked agencies already provide teacher material, some of which draws on research evidence. Part of the future vision should surely be that the evidence in such materials, from wherever it has been drawn should be verified according to agreed scientific standards and made widely available in handy reference formats.

Teaching materials

The materials used by practitioners to plan, support and assess learning would also be routinely designed on the basis of verified evidence. This would integrate theoretical understanding, from disciplines such as psychology, sociology and neuroscience, with understanding of practice gained through

BOX 4:	Reference material – an example
	The Lancet is a user-friendly professional journal for healthcare professionals.[29] Written for a wide range of audiences, it includes news, updates, commentary, opinion and articles summarising important research advances and their implications for practice. It appears weekly and has extensive web-based archives organised around practice-based topics for easy reference.

[29] See website at http://www.thelancet.com/

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> *(in Finland) teacher education is orientated towards developing a research-based professional culture. Scientific literacy is crucial… Student teachers learn to internalise the attitudes of researchers as they do their work.*

experience. Because different pieces of research evidence may conflict with one another, rigorous syntheses will be part of the future, offering where necessary alternative interpretations aimed at informing the decisions that routinely have to be made in practice. To achieve this, materials would have been developed through trialling alternatives in various contexts, with specialist practitioners working in partnership with researchers. The expertise of editorial, media, design and marketing specialists would be incorporated in the R&D teams to ensure the knowledge is organised and communicated effectively.

Evidence-using skills

To enable practitioners to make appropriate choices about procedures, information sources and learning materials, their own skills would have been developed as part of their initial and continuing training. Their ability to locate evidence and to assess its worth and relevance would be part of an evidence-using component. We can imagine how this might be by looking at countries where the training of teachers operates at a more advanced level than in the UK. In Finland, for example, initial teacher training is at Master's level and involves research. In the words of a Finnish Education Research Association publication[30],

> *'Teacher education is orientated towards developing a research-based professional culture. Scientific literacy is crucial… Student teachers learn to internalise the attitudes of researchers as they do their work.'*

A key issue is to enable the teacher, as evidence-user, to understand the problems of interpreting research findings and of adapting or reworking them for the local context. A future vision might be of evidence providers revealing the context and limitations of their studies consistently and transparently and evidence users being skilled in assessing and adapting evidence or developing their own.

Support services

Public services that assist the practitioner in developing their skills would highlight the nature and quality of the evidence behind the materials they promote, as well as describing

their usefulness. Documentaries on Teachers TV and resource banks for practitioners for example might refer routinely to the research that supports or contradicts the assertions made.

Specific enquiries

From time to time special issues arise for which a special enquiry is needed. For example a physics teacher might ask about the effect of using computers to collect data in a physics practical compared to using manual methods. In our future scenario he or she would have easy access to syntheses of research findings on the issue. If a relevant one were not available the teacher would turn to the professional association for advice. These associations would not only have access to and be familiar with syntheses of evidence on specific issues, but would be likely to be participants in review groups that initiate them or keep them up to date. Currently guidance from such associations is often restricted to opinions about good practice because sound experimental studies and rigorous reviews of evidence are so scarce.

More general enquires about the evidence for specific issues in teaching and learning might be routinely channelled through nominated staff in schools and colleges carrying responsibility for research. Libraries would provide broadband access to online evidence portals and databases, with librarians equipped to support and promote their use. Librarians and CPD coordinators would have received training in techniques for searching and accessing evidence. They are key agents in the development of the evidence-using culture.

Local research

From time to time, in some instances, an original research study might be called for because relevant, contextualised evidence cannot be found from elsewhere. The teacher concerned, or their team or institution or cluster, might set up or join in a project. Senior managers would be involved in securing the resources and finding external links to support the activity. Since problems occurring in one locality are likely to be replicated elsewhere, a

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[30] *Research-based teacher education in Finland.* Nieme and Jakku-Sihvonen, pp. 36–37. Finnish Education Research Association, 2006

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local institution might well use networks to link up with local authorities and national agencies or with professional bodies and universities to collaborate over the design and conduct of a study. Networks help to pull in expertise, motivate activity and spread the emerging results of enquiries. In our future vision such examples would be commonplace and practitioners keenly aware of their existence. (See Box 5 below.)

The middle manager

Around the front-line practitioner sit the heads of department, team leaders, coordinators and leadership teams. As well as being themselves teachers they have additional roles to play as team leaders. They would help the front-line person access external expertise and resources to support the use of evidence. They would encourage expectations at organisational level and set up structures to make evidence use a regular and manageable feature of professional life. They would preferentially purchase resources that are evidence-based and routinely underpin their INSET activities with evidence – condensed, adapted and explicitly cited.

But they also have evidence needs of their own. They need easy access to sound, relevant evidence to inform day-to-day decision-making on, for example, timetabling methods or staff appraisal. They also have strategic decisions to make on, for example, purchasing resources or communicating with parents, for each of which a serious body

of research evidence would be expected to be available. In our future world, these expectations are part of the routine practice of management.

The senior team

Senior managers, in addition to their direct involvement as front-line practitioners, play crucial roles in creating an evidence-using ethos. Studies have shown that the support and involvement of a senior person is strongly associated with successful research cultures in schools and colleges. To quote one[31]:

'Leadership was of key importance to research engagement at school level. A school's research orientation was strongly influenced by school leaders who were interested in enquiry, encouraged staff to question practice and wanted to use research for school improvement… leaders who valued research, encouraged reflection, placed a high value on staff development… and were willing for staff to experiment and take calculated risks.'

In our future scenario, leaders with this orientation would be more commonplace because it would have been an important criterion in their selection.

As well as leading by lending support they would also be using evidence themselves as a normal aspect of their decision-making, both in day-to-day issues such as behaviour management or staff appraisal and for

BOX 5:	School/college-based research: an example
	At Farnborough Sixth Form College teachers have been investigating student participation in maths, the use of role-play in history and the effects of peer support on student motivation. Beginning with funds from the Department for Education and Skills to research emotional intelligence and the use of classroom technology, the college decided to continue when the funding stopped. A psychology teacher gives colleagues day-to-day support in their research projects and participants are paid an extra £600 to help them run a project and disseminate their findings. The final report is published in the college journal and on its website. Research gives staff the chance to refresh their own practice and share their ideas, whether formally in their reports or informally in the staffroom.

[31] Sharp, C. *et al.,* 2005, *Investigating the research engaged school*. NFER 2005. See
http://www.nfer.ac.uk/research-areas/pims-data/outlines/investigating-the-research-engaged-school.cfm

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"quantitative information about the 'effect size' of different options… would enable alternative strategies not only to be entertained but also to be weighed in a systematic manner…"

more strategic issues. They would be able to compare detailed up-to-date internal data about patterns of enrolment or admission or performance with benchmark data from national regional and local sources. They would be looking at the results of comparative trials of alternative ways of organising their institution, not only to get ideas but also to get quantitative information about the 'effect size' of different options. The latter would enable alternative strategies not only to be entertained but also to be weighed in a systematic manner as in the original research on formative assessment:

> *'learning gains of this type are measured by comparing the average improvements in the test scores of pupils involved in an innovation with the range of scores that are found for typical groups of pupils on these same tests. The ratio of the former divided by the latter is known as the effect size. Typical effect sizes of the formative assessment experiments were between 0.4 and 0.7. These effect sizes are larger than most of those found for educational interventions.'*[32]

Senior teams would also be looking to research evidence relating to their development plans. Impact assessments of alternative options for college mergers or school clusters for example would be referred to; or evidence on the pros and cons of specialist provision, or particular staffing structures or space allocations. In some situations the team might choose to invest in a local trial of alternative options with the prospect of making savings from finding more cost effective methods.

Bodies linked to practice

Outside the local practice base lies a complex of bodies, groups and individuals that interact with it: the local community, governors, parents, employers, local authorities, agencies and professional bodies, other schools and colleges and, not least, the citizen. In relation to evidence, organisations and networks outside teaching play crucial roles. They may supply or mediate evidence (as professional bodies do), or help generate it (community organisations), or collate, filter and synthesise it (national agencies) or contribute to interpreting it and drawing out its implications (parents, employers, governors). (See Box 6 below.)

Governors are called upon to make difficult decisions for which easily accessible evidence, formulated around the problems of school and college organisation, would be an enormous asset. Might not the school or college of the future have access to such an evidence base? Might local authorities and school clusters pool their resources to create it?

The role of researchers

And finally, how do we see the role of researchers in this scenario? A multiplicity of types would be apparent, each respected for their particular kind of contribution: scholars, experimentalists, field researchers, statisticians, and ethnographers. Some would be engaged on long-term fundamental studies, perhaps with longitudinal elements monitoring effects on people's lives. Others would engage interactively with practitioners on localised, context-specific investigations, for example

BOX 6:	Engaging all – an example
	An example from an Infants school in the West Midlands provides a glimpse of an evidence-using future. A small project on improving the teaching of reading began with a few teachers looking at benchmarks and investigating their own practices rigorously, through a combination of small-scale research and local improvement action. Attainment in reading went up, which encouraged other teachers to participate. Subsequently governors and parents became interested in what became ultimately a whole-school, evidence-informed approach.[33]

[32] *Inside the Black Box: Raising Standards Through Classroom Assessment* Black, P. and Wiliam, D. Available via http://www.dianelauer.com/Assesslearntool/blackbox.pdf

[33] See Colmore Infant School on p3 of http://www.pre-online.co.uk/REpdfs/4_researchengagedncsl.pdf

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" the knowledge brokers are a key professional force, having evolved from the previously fragmented population of coordinators, developers and field staff…"

on teaching techniques for specific topics. Teamworking would be the norm across educational disciplines and professions, as it is in fields such as construction or social care today.

Researchers would be interacting regularly with other kinds of professional concerned with communicating research and scaling up its impact. They might participate in promoting a wider 'public understanding of education' as natural scientists currently do in relation to public understanding of science. Alongside their practitioner colleagues they might participate in roadshows, TV documentaries and consultation events that help the public understand the evidence as well as the political arguments behind issues.

A wide variety of approaches to innovation and development would co-exist: some, analogous to design processes would have a 'try it and see' approach, encouraging creativity, multiple approaches and rapid disposal of failing ideas. Others would emphasise thorough testing of practical solutions in real world environments – an 'engineering' approach; others would be more scientific, involving careful measurement and experimentation and the development of theory. Such diversity would be welcomed and researchers of a different stripe would regard one another more as collaborators than as methodological or epistemological opponents.

An evidence-using culture

Viewed across the full range of professionals and citizens, it is clear that these scenarios describe more than a set of initiatives or practices, they suggest an altered culture, in which people are familiar with and make use of evidence routinely. It informs the way teachers are inducted and updated, teaching and planning carried out and clients advised and guided. Teachers with special responsibilities for advancing and spreading knowledge

seek out evidence for particular purposes and facilitate training in how to locate, assess and make use of it. Local investigations and adaptations of research from elsewhere are encouraged where appropriate. Managers are periodically brought up to date with evidence by appropriate bodies and helped to assess and prioritise it; they use it to inform improvement planning for their institutions and use their practical experience reciprocally to bring out questions for which research is needed.

In this world, schools and colleges are routinely linked into partnerships with HEIs or other research organisations to provide support in formulating their questions and designing their enquiries. These provide methodological advice and collaborate to carry out investigations, interpret evidence, and develop research skills. Libraries, staff workrooms and offices have computer terminals and posters to help staff make reference to evidence through portals, bulletins, databases and journals. The agents that cultivate and develop this culture – the knowledge brokers – are themselves a key professional force, having evolved from the previously fragmented population of coordinators, developers and field staff associated with initiatives linking practice with research. Government-linked agencies take a lead in promoting this crucial brokerage role and support the growing culture by encouraging the use of scientifically sound evidence.

Conclusion

This portrait of a world of evidence in routine use is of course idealised. Even in those public services where evidence is currently more widely used, these ideals are not fully realised. The speculative exercise has nevertheless prepared us for consideration of the changes that would be needed if an evidence-using education service were to be brought about. It is to these that we now turn.

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3   Changes needed

> *"The most pressing need is to alter the funding practices that result in too many small-scale research projects, on short timescales, isolated from the improvement programmes and policy objectives that inspire them."*

Nature of changes

We have now sketched out something of the condition of evidence in education today and what an evidence-friendly world might look like. The difference between the two suggests the kinds of change needed. Some are fundamental, requiring shifts in thinking, culture and incentives, for example: incentives for practitioners and policymakers to participate in the research process for academics to focus on the routine problems of the education service. Other kinds of change are more procedural and could be imagined as emerging even within current ways of thinking and behaving – for example, linking research more closely to development of tools and processes for teachers. In the following sections changes of both kinds are addressed, first in relation to knowledge production, then in relation to practice and finally in the way these two domains are connected.

Research production and output

D & R programmes

The most pressing need is to alter the funding practices that result in too many small-scale research projects, on short timescales, isolated from the improvement programmes and policy objectives that inspire them. Parallel programmes of research and development are needed, focusing on agreed priorities in the public service. Several strategic approaches to this have been outlined in recent years. The National Educational Research Forum, as part of its remit to advance evidence-informed practice in education, proposed the creation of 'D&R' programmes that combine major public interventions on key problems with associated research.[34] Although these proposals were not taken up by government, pilot programmes are being implemented on a smaller scale in several places, linked by a 'D&R network'. More recently a report has been published by the Innovation Unit setting out the case for a D&R system for education.[35] Related ideas have been emerging in several countries, for example the 'design study' or 'design experiment' concept in the USA[36] and the various models of 'research into practice' put forward by Hugh Burkhardt and Alan Schoenfeld.[37]

Dual purposes

The purpose of such integrated programmes is twofold. First, to advance knowledge to inform the public education service, not simply for its own sake (though the latter is, of course, also vital and a key task for the academy). The focus of such programmes is the actual problems of delivery, including the tough ones associated with making improvement happen in practice. The second purpose, so easily overlooked in the instrumentalism of improvement action, is to develop and deepen knowledge and understanding. This involves the development of theory, or conceptualisations that enable generalisations to be developed from investigations carried out in one particular context. Such theorisation clearly needs to be rigorous and tested, but without it large-scale change across the myriad contexts of learning will not happen.

D&R approaches

Major integrated programmes combining development and research start from major problems on the ground. There are many of these and some process of prioritisation is needed to establish agreement across practical, theoretical and political leaders about what they should be. Programmes might be initiated around a planned policy intervention, for which developmental funds have been committed. The design of the

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34 *Strategic Proposals* NERF Working Paper 3.1. 2003. Available from http://www.standards.dcsf.gov.uk/nerf/word/WP3.1Strategicpropfinal.doc?version=1

35 *A D&R system for education.* Bentley, T. and Gillinson, S. Innovation Unit, 2007. Available from www.innovation-unit.co.uk

36 See for example *Research as Design* in Educational Researcher vol.32 no.1. E. Kelly. 2003 available at http://www.aera.net/publications/Default.aspx?menu_id=38&id=393

37 *Improving Educational Research: Toward a More Useful, More Influential, and Better-Funded Enterprise.* Burkhardt, H. and Schoenfeld, A.H., 2003. Educational Researcher, Vol. 32, No. 9, pp. 3–14

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programme starts from a review of existing knowledge, to accompany the political idea driving it. Such a programme needs to engage practitioners, delivery managers, researchers and policy-makers in a collaborative effort throughout. In the early stages this wide engagement is vital to get the design right and to secure 'buy-in' to the programme and its messages as the intervention proceeds. The delivery of the programme involves successive cycles of trying, evaluating, revising and retrying, engaging both practitioner and research expertise in each iteration.

Methods

The particular methods used in a D&R study are determined by the problem in hand; none is favoured *a priori*. However, there is currently a global shortage of expertise available for some types of method – particularly those involving quantification. Many problems call for longitudinal and statistical methods; others require experimental approaches in which different potential factors are separated out in controlled trials. Lack of capacity in these areas means they may have to be built up *as part* of the programme itself. (See Box 7 below.)

Materials and procedures for practice

In a number of public services with which education is sometimes compared, notably social care and healthcare, there appears to be a more pronounced sense of 'procedure'

shaping the daily work of the practitioner. Is education, in which the quality of social relationships so important, different in this regard? Are procedures an irrelevance or simply underdeveloped?

Examples

In healthcare the application of science and technology has led to a growing body of research evidence, based on trials, which supports or undermines particular procedures. In education such trials are much rarer (though less so in the USA than the UK). However in areas of healthcare more closely related to education, for example, use of alcohol by schoolchildren, there have been trials and these have resulted in practice guidance covering recommendations and issues of implementation.[38]

In the field of social care, where trials are also uncommon, the Social Care Institute for Excellence nevertheless combines research evidence with other forms of knowledge as a basis for guidance on practice. (See Box 8 on page 27.)

Perhaps there are some areas of education in which a more proceduralised, evidence-based approach could play a bigger part. A clearer sense of a 'procedure' may help at one level whilst more open-ended approaches suit another. In the area of formative assessment, for example, Black and Wiliam[39] engaged teachers

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BOX 7:	**Integrating development and research – an example**

The *Cost Calculator for Children's Services* is purpose-designed software that calculates the costs of social care processes and placements for looked-after children. It facilitates comparisons between the relative values of different types of care, making it easier to estimate the potential benefits of introducing a range of alternative packages.

The model was developed at the Centre for Child and Family Research (**http://www.lboro.ac.uk/research/ccfr/**), as part of a research project that aimed to explore the relationship between costs and outcomes for looked-after children. ESRC-sponsored Knowledge Transfer Partnerships with two local authorities were used to calculate unit costs. Meetings with users discuss which additional variables on children's characteristics and outcomes are needed to better meet the reporting needs of individual authorities, and to suggest how these should be incorporated.

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[38] NICE. Guidance: *Interventions in schools to prevent and reduce alcohol use among children and young people.* Available via: http://www.nice.org.uk/nicemedia/pdf/PH007guidance.doc

[39] *Working inside the black box.* Black, P. *et al.,* 2002. Dept of Education, Kings College, London

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BOX 8:	**Evidence-based practice guides – an example**

A web-based practice guide from the Social Care Institute for Excellence, *Dignity in Care*, provides information for service users on what they can expect from health and social care services, and resources and practical guidance to help service providers and practitioners in developing their practice. It offers options for those who only have five minutes to get some quick ideas and for others with five hours to gain an in-depth understanding. It contains:

- *information and guidance:* how to tackle poor standards of service
- *practice points:* key pointers to improving the dignity of older people
- *ideas from practice:* examples of tangible ways in which dignity can be incorporated into care
- *policy context*
- *key research* and policy findings, with references
- *guidance* and standards
- *links* to further information and useful websites.

in 'mini experiments' of their own choosing. Findings were collated and clear procedural statements developed for teachers: 'wait several seconds for pupils to answer questions', for example, or 'provide comments in your marking about what a student needs to improve and how they can do it'. In addition to these kinds of statement, other more nuanced suggestions from individual teachers were put forward about how to carry out the procedures in practice.

Another example of useful procedure is illustrated by the development of the ALIS ('A' Level Information System) and allied services at the Curriculum Evaluation and Management Centre at the University of Durham.[40] (See Box 9 below.)

There are likely to be many other areas in which evidence could be developed in order to provide a clear procedural framework within which practitioners could operate more effectively, without limiting their creativity.

Evidence for procedures
Where procedural advice is to be spelled out, the evidence for it needs to be gathered and tested thoroughly through studies that compare one approach with another and quantify the effects. An example in the area of sex education involved a random selection of schools receiving the peer-led approach under study, which were compared to others that did not.[41] Such trials have also been used on a smaller scale by individual teachers

BOX 9:	**Developing procedures**

The Curriculum Evaluation and Management Centre at the University of Durham has developed procedures, with schools, for monitoring pupil progress (value added), by measuring what matters – attitudes, safety, relationships, learning and teaching processes. Data from schools and colleges are analysed externally to enable fair comparisons to be made for use by teachers in motivating students and managing processes. The Centre works with teachers through training, research and development and has become the largest provider of performance indicators to schools and colleges in the world, through the use of distributed research projects.

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[40] See the Curriculum Evaluation and Management Centre at http://www.cemcentre.org/

[41] *Randomised Controlled Trial of Peer-led Sex Education* by Charleston, S. *et al.* 2002. SSRU, Institute of Education. London. Available via http://www.ioe.ac.uk/ssru/reports/Randomised_Controlled_Trial_of_Peer-led_Sex_Education.pdf

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> *...strengthen teachers' capacity to read, use, produce and assess evidence-based sources for the development of their own work as professionals.*

in schools and colleges, though it is not common. To extend the use of such methods will require more widespread understanding of their strengths and weaknesses, particularly amongst research funders.

Proliferation of materials

An increasing problem for teachers, managers and others is the rapid growth in the number of documents hitting their desks. Evidence-based materials sent to schools and colleges have to compete for attention in this maelstrom. Government agencies, professional bodies, single-interest groups, assessment organisations and support bodies all produce it and there is no coordination or plan to limit the pressure it produces (apart from internal government mechanisms). It seems impossible to manage this excessive flow, which threatens to make evidence-based guidance appear as yet another burden to the practitioner. Yet in many fields it is considered crucial that guidance based on evidence does reach the front line and is absorbed. Advances elsewhere could be instructive for education. In healthcare for example, research is undertaken about *how to implement* guidance and how practitioners respond to it, as well as about the substantive issue itself; in social care, the way in which local institutions make use of evidence has been studied.[42] These examples suggest that guidance needs to be produced addressing *all* aspects of the problem faced in reality, not just the bits for which evidence comes to hand – practitioners have to take decisions all day long, whether or not the evidence is there. An instructive example is offered by the format for practice guides developed at the Social Care Institute for Excellence (SCIE).[43] These set out the status of the evidence surrounding each aspect and, where it is unequivocal, provide firm advice, where it is divided, set out the evidence for each alternative so the practitioner can interpret it for a given situation.

Professional formation and development

To enable research evidence to influence practice effectively it needs to be readily available for use as and when issues arise in practice. Professional formation and development processes are central to this and research evidence needs to play an increasing part in it. In Finland, a country with highly effective educational provision, as measured by the PISA assessments,[44] teachers undergo research training at Masters level as part of their initial formation, in order to

> *'...strengthen teachers' capacity to read, use, produce and assess evidence-based sources for the development of their own work as professionals.'*[45]

In England national agencies such as the Training and Development Agency for Schools and the General Teaching Council are making strides in the use of research evidence as part of teacher education. These important initiatives are engaging some practitioners with research evidence and testing out ways of doing this effectively. The next challenge is to raise the expectation of this as a normal part of professional formation for all. If initial teacher education were to be elevated to Masters level, as is increasingly under discussion, a research capability would become an important element for both trainees and trainers.

Mediating change

Brokerage

Having sketched above some of the areas in which changes could be expected – research production, teaching materials and professional development, we now need to consider what is known about the process of bringing about change itself.

First, it is becoming increasingly clear that the role of organisations and individuals operating as brokers *between* producers and users of knowledge is crucial. On the ground a host

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[42] *Improving the use of research in social care practice.* Walter, I. *et al,* Knowledge review 07: SCIE 2004

[43] See for example: http://www.scie.org.uk/publications/practiceguides/fostering/index.asp

[44] PISA. *Programme for International Student Assessment*. OECD, see
http://www.pisa.oecd.org/pages/0,3417,en_32252351_32235907_1_1_1_1_1,00.html

[45] *Towards more knowledge-based policy and practice in education and training.* Commission of the European Communities Brussels, SEC(2007) 1098, Commission Staff Working Document

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of structures has grown up to do just this for various kinds of client: some provide research summarised for teachers, some evidence-based guidance for practice, and others bring together the diverse communities in collaborative activity.

At the policy level, the issue of 'linking evidence to practice' was identified by OECD as a key issue meriting a dedicated international conference in 2005. It identified brokerage as a key function and explored the functions and achievements of brokerage agencies in Denmark, the Netherlands, Canada, New Zealand and the UK. The conference revealed how deep were the differences of view between policymakers and researchers in education – even greater than those between countries. Differences in culture, incentive and tradition between stakeholders were seen as major obstacles and the absence of mechanisms at school level for making use of evidence perceived to be holding back progress on improvement. The need for brokerage to enable stakeholder groups to understand each other and work together effectively is a truly global phenomenon.

The key role of the individuals and structures that operate between researchers, practitioners, decision-makers and policymakers needs to be recognised, professionalised and resourced. Their skill is to understand and empathise with the conditions and incentives that prevail on all sides and to find specific ways of communicating across the boundaries. This is important in establishing the kind of issues that are researched, the kind of evidence that is adduced and the means by which it influences practice. A key issue for budget strategists is to work out who should pay for this brokerage function – lying as it does between research, policy and practice; it is difficult for any one of these communities to shoulder the cost alone. Some current initiatives are funded by government and its agencies, some by consortia of local authority directors, others by charities and foundations. If brokerage is to expand, how should it be paid for? Should it grow at the expense of primary research? Should end-user organisations (such as schools and colleges) be expected to contribute to costs? (See Box 10 below.)

A particular problem in education is that the brokerage function is carried out in a fragmented way because the organisational base is fragmented, both by function and by phase. The example of the Social Care Institute for Excellence demonstrates what might be achieved were one major centre to be developed across the multiple elements of the education service. It

> *'works to disseminate knowledge-based good practice guidance…and…enhance the skills and professionalism of social care workers…by providing reliable, up-to-date and thoroughly-researched guidance and practical tools on the big issues in social care.'*

The proposals from NERF for an Evidence Centre for Education[47] call for a corresponding entity in education.

BOX 10:	**Brokerage agencies – an example**
	Research in Practice[46] promotes positive outcomes for children and families through the use of research evidence, working in collaboration with the Association of Directors of Children's Services and a network of over 100 participating agencies. It identifies effective methods of understanding and using research by working intensively with a small number of ambitious agencies, testing and evaluating new methods of promoting evidence-informed practice (EIP), and promoting it across a broad membership. It provides network exchanges, change projects, learning events and publications.

[46] See website for *Research in Practice* at http://www.rip.org.uk/aboutus/index.asp

[47] *A National Evidence Centre for Education.* NERF Working Paper 4.1 (2005). Available from http://www.standards.dcsf.gov.uk/nerf/word/WP4.1NECEfinalreport.doc?version=1

"To bring about mainstream change involves more than initiatives and enthusiastic individuals: clear professional incentives are also required."

Roles and responsibilities

The kinds of changes envisaged in this paper are not predicated on altering the fundamental role that each kind of professional plays – to do so would be absurd. Instead, they suggest a need for greater mutual understanding between the professions to enable them to work together more effectively. Researchers for example, specialised and immersed in data as they are, cannot be expected also to excel as communicators or entrepreneurs. Practitioners, confronting human dilemmas minute-by-minute, may or may not be researchers, but do need to draw on evidence speaking directly to the issues they face. Managers, solving problems of development and strategy, likewise need to use evidence in the right form at the right phase of their decision-making cycles. Policy officials work regularly with research evidence but also have to sense where the political drive is going and be responsive to it; they have to blend the twists and turns of political fortune with their experience of the fate of previous policy initiatives. Neither group needs to mimic the other but all need to work together to determine what is to be done and how it is to influence practice.

Incentives and rewards

The foregoing analysis brings out some of the changes that are needed and points to a number of relevant initiatives already in place. But to bring about mainstream change involves more than initiatives and enthusiastic individuals: clear professional incentives are also required. Various kinds of incentive operate on educational practice: prospects of advancement, release from front-line duties, favourable inspections and conformity with regulation, for example. Changes in the incentive structures provided by management, inspection and regulation are needed in the long run to transform promising initiatives into culturally embedded change.

Conclusion

In summary, changes are called for across the board, from the way in which research priorities are set and programmes designed to the way in which teachers are trained and developed. Most of the changes needed are in themselves neither difficult to visualise nor especially controversial. The benefits of such changes could be felt by any party to education: teacher, parent, employer, community, and institution. In principle they could result in more motivated teachers and learners, more thoroughly engaged parents and employers and better designed interventions. The likelihood of this occurring depends crucially on the manner in which such changes are wrought. The roles to be played, the incentives and resources required need as much consideration as the nature of the changes themselves. It is the problems of implementing change rather than of specifying it that are governing the growth of an evidence-using culture in education. It is to reflections on these that we now turn.

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4   Bringing about change

> *Should the development of educational practice be more of an integrated design process, drawing on both scientific and practical knowledge, rather than a struggle between the two?*

Rethinking

Having considered changes in the way research is carried out and utilised, we now develop ideas about ways of *thinking and acting* to bring them about in practice.

A holistic view

The first idea is the need to conceptualise educational research as a single whole. The 1998 Hillage report[48] and the 1995 OECD[49] study confirm how just fragmented the field is: dozens of different perspectives, hundreds of power bases and an array of stakeholders working in isolation from one another. Within this maelstrom, each community tends to conceptualise research in its own idiosyncratic way. In policymaking it may tend, by default, to be handled as a commodity – something to be specified and procured. This limits from the outset, the extent to which knowledge creation can be creative, open to failure, trial and error or unexpected turns. It places emphasis on tangible outputs such as reports and seminars and undervalues effects on thinking and motivation in people, known to be key factors in successful impact. It is annualised to conform to budget-setting cycles, creating serious problems for sustained scientific study and retention of expertise. Within the university world the concept of research easily defaults to academic activity that promotes the university's interests, such as recruitment of doctoral students and publication in prestige journals. It is conceptualised within subject disciplines and is required to serve the career interests of individuals. Within the practitioner world, by default, it is often conceived as something distant, abstract and obscure, of marginal value in daily practice. These distinct conceptualisations of research need to be integrated if the interests of the education service as a whole are to be served.

The role of science

The second idea is to clarify what is reasonable to expect of the sciences in support of the education service. They have many aspects: meticulous recording of data, development of hypotheses, testing of propositions, experimentation to isolate different variables and so on. They progress as much through null or negative results as through positive ones and lead to valuable information, generalisations, patterns and so on. But, of themselves the sciences are unlikely to yield directly the kinds of information that policymakers and practitioners are looking for. It is not the role of science to do so.

However there are other endeavours that *draw* on science and also face outwards to problems in the practical world: technology and design processes are of this kind. Perhaps it is to these that we need to look for inspiration in education. In a design approach, the problem to be tackled is the starting point – the chair or tee-shirt or transport interchange – not the knowledge *per se*. Careful definition of the problem, and imagination about how it might be tackled, are crucial; scientific knowledge is looked to in relation to what has worked in the past; and business considerations, such as costs and timeframes, are integrated in the design process. Should the development of educational practice be conceived of more as an integrated design process, drawing on both scientific and practical knowledge, rather than as a struggle between the two?

Border country

The boundary between science and practice is however not a clear-cut line. It is a border country that has developed between a number of areas – pharmacology in relation to medical practice, civil engineering and the construction industry, social sciences and the social care services, for example. Several different ways of working within this intermediate zone have been developed over recent years. In higher education, for example, the so-called 'technology transfer' process has seen partnerships between industry and HEIs flourish, applying academic

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[48] *Excellence in research on schools.* Hillage, J. *et al.* DfEE Research report RR74. 1998

[49] *Educational Research and Development: trends, issues and challenges.* OECD, 1995.

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> *Ultimately successful transfer… comes back to a… a vibrant sense of curiosity and a deep respect and desire for learning from others…*

knowledge to industrial and commercial problems. In government-linked agencies R&D is commissioned that connects researchers with actual problems of practice. In these examples, as in the design process described above, there is a dedication to developing a product of clear use-value and a corresponding focus on identifying, defining and addressing key practical problems; programmes respond flexibly to the actual experience of day-to-day practice.

'Technology transfer'

In the case of education this intermediate realm of activity between science and praxis appears to be in particular need of development. Is there an opportunity to build something akin to 'Technology Transfer' operating between the natural and engineering sciences and manufacturing industry? This process of adapting, synthesising and re-articulating knowledge for use helps to connect the world of disinterested scientific exploration with the pragmatic world of problem solving and improvement. To achieve this a new kind of professional expertise has to be marshalled to speak the languages and understand the cultures of the diverse partners, to facilitate exchanges between the sectors and spot opportunities for cross-fertilisation.

Educational analogue

Is some kind of analogue possible for education? Would a brokerage function of this type enable producers of research to serve the education service more effectively? If so, might it not lead to scientific knowledge being collated and synthesised in relation to the needs of the education service? Could resources from higher education and government be moved into this 'third mission', perhaps from budgets currently devoted to intervention and research? Could organisations working close to practice be made aware of the possibilities of such 'technology transfer' brokerage? Might a professional field of brokerage consequently develop, giving power and structure to the work of intermediaries oscillating between the scientific and practice communities? There are

many indicative examples of practices already in existence in education that embrace the 'technology transfer' approach upon which such an endeavour might be built.

Factors affecting change

Previous initiatives

There are many interesting initiatives taking place in evidence for education offering inspiration and pointing the way. But there are also many that have been allowed to fizzle out or brought to a halt – the Best Practice Research Scholarships, Networked Learning Communities, Learning and Skills Research Centre, National Educational Research Forum, to name but a few. Of course where they cease to be effective, initiatives need to give way to new ones, but it is important that advances and ideas are kept moving forward consistently, from generation to generation. New initiatives and sources of funding need to build on and *sustain* earlier advances as well as contribute something new.

Constraints

Some of the constraints on change are economic or financial: it costs extra to start things up; longer-term changes are difficult to account for in annual budgets. This can result in a significant loss in scientific terms because it makes longitudinal elements that trace effects over several years so rare in research designs. Psychological factors also influence the process of change. An example is the way in which good practice passes from one place to another. A review of the process between schools suggests that 'in the transfer of good practice…relationships seem to precede and be required for meaningful transfer, and this is a matter of psychological receptiveness'.[50] In the words of a 1998 US study[51]

> *'Ultimately successful transfer…comes back to a…vibrant sense of curiosity and a deep respect and desire for learning from others…'*

In the UK a study of science teachers' receptiveness to research evidence was

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[50] *Factors influencing the transfer of good practice. Initial Literature review.* Fielding, M. *et al.* 2001. University of Sussex and Demos.

[51] *If only we knew what we know.* O'Dell and Grayson. California Management Review 40 (3) Spring pp 154–172

> *Weight of evidence is rarely sufficient to change educational practice – claims must also resonate with prior beliefs and experience.*

carried out as part of the TLRP research programme,[52] which found that

> *'Weight of evidence is rarely sufficient to change educational practice – claims must also resonate with prior beliefs and experience.'*

A further kind of constraint, 'bounded rationality', is analysed by Michael Feuer, of the US National Research Council, using evidence from cognitive theory. He proposes that we are in danger of overstepping the bounds of people's capacity to compute solutions to problems rationally. Real problems are subject to so many variables and information so plentiful that we may be unable in practice to follow all the rational processes demanded of us by policy or good practice advice. He proposes a kind of covenant between researchers and policymakers to limit their expectations of each other. Researchers he asks should 'adjust their… standards to reflect reasonable outcomes… and timelines' and should 'curb their enthusiasm for finding fatal flaws'. At the same time policymakers should 'curb their political instinct for drama and… promote knowledge accumulation'. Experience in UK education would certainly support the idea that the very complexity of procedures, plans, target-regimes and appraisal procedures can hinder change. Such systemic resistance occurs, of course, without regard for the intrinsic merit of any changes actually proposed.

Realities of practice and policymaking

Factors that constrain practitioners' capacity to respond to research have been identified in recent studies. The 2007 CfBT review *Practitioners and Evidence,*[53] uses evidence from social care, healthcare, the criminal justice system and education to identify such factors. They include: difficulty in locating relevant studies; the inaccessibility of research language; conflicts with existing knowledge and beliefs; lack of time, resources and support. The review from the Research Unit

for Research Utilisation, *Using evidence: How research can improve public services,*[54] reveals a surprising correspondence between policymaking and practice in that in both communities research is more likely to be taken up if it is 'relevant and timely; has clear and uncontested findings; comes from a credible and trusted source and was conducted within the context of its future use'.

There are serious constraints on the use of evidence in policymaking too. The sheer pace of change at the political level can preclude systematic study of existing evidence prior to action. Relevant systematic reviews of evidence are still unlikely to be 'in stock' when a new policy initiative is proposed because so few have yet been done. Advice to ministers may rely on just one or two single studies, inviting the possibility of evidence being used partially to suit a particular policy direction. The absence of a national centre for accumulating and assessing evidence gives full rein to political, economic, sectarian and personal opinions on matters of immense public importance where the voice of science should prevail.

The process of change

Despite these numerous constraints on the process of change, a number of factors are known to facilitate it. Recent studies illuminate the way evidence impacts on people and 'good practices' move around. Several important factors emerge consistently from these. In summary:

Production
To influence practice, it helps if practitioners are involved in the research itself. They might participate in the research team, carrying out local research or contribute their knowledge of experience. Involvement in the design of the research can improve the quality of the study and also improve its take-up in practice.

Responding to research
Practitioners tend to respond to evidence selectively and to prefer informal sources

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[52] *Towards evidence-based practice in science education no 4.* TLRP Research Briefing 2003

[53] *Practitioners and Evidence.* Morris, A., Percy-Smith, J. and Rickinson, M. CfBT working paper, 2007. Available from http://www.cfbt.com/evidenceforeducation/Default.aspx?page=375

[54] Nutley *et al.* op cit, pp 68–71

such as conversations about conference speeches or press articles. Where findings or ideas are actually taken up it is often through a process of local adaptation. The process may take time and involve unlearning previous ways as much as learning new ones. The institutional environment is a major factor influencing change, and open organisations, in which information is accessible and research use encouraged, are more likely to take on evidence-informed change.

Networks, consortia and partnerships

Evidence-based changes are more likely to occur when social and interactive processes are enabled. Networks and partnerships facilitate this; they help individuals overcome obstacles, and develop confidence through collaborative working. They bring together skills, cross-fertilise thinking and spread evidence and innovative practice.

Using knowledge

Knowledge is often used conceptually and strategically as well as instrumentally according to studies at the Research Unit for Research Utilisation. In the hurly-burly of educational practice it is easy to overlook the importance of the conceptual use – the role of reading and thinking in changing the way we conceptualise what we do. Research findings do not simply find their way into use by direct application in guidance materials, they also affect the way we think. (See Box 11 below.)

BOX 11:	**Effective processes of change – two examples**

Sharing theories of action

In an initiative on improving leadership for literacy in New Zealand[55] the Ministry of Education awarded a contract to appoint 20 national facilitators to assist school leaders, based on a 'flow-down' model, with messages flowing from one level down to the next, and a university team was contracted to evaluate it. The evaluation showed that whilst the teachers said they were satisfied with the programme, there was no evidence that *student achievement* had actually improved. The evaluators put this down to the absence of a shared theory of action between the ministry who funded the initiative and those who implemented it. The ministry, unusually, agreed to start again using a formative approach this time, as recommended by the evaluators – processes and tools were developed jointly by teachers, facilitators and researchers. This resulted in large improvements for students (with effect sizes of 0.8 to 2.05 – high for literacy interventions). The 'flow-down model had been replaced with a trickle-down one' and the tacit theories of action of ministry officials, teachers and intermediate facilitators made explicit, shared and challenged.

Collaboration between agencies and sectors

An internet portal to make evidence more readily available to busy practitioners has been developed by a voluntary consortium of partners in the UK, coordinated by CfBT Education Trust. Starting from an idea of two or three people to provide evidence for practice, a scheme was devised which others gradually joined. The idea was backed by a software company and the portal built as a gift. As the enterprise became more solid, major players joined – information specialists, government officials, charitable and research foundations and ultimately practitioners. Collaboration enabled expertise in librarianship, information technology and pedagogy to be combined – itself a notable achievement – so that solutions to previously insuperable problems were found. By enabling participants to contribute on equal terms, exchange ideas and share skills, this bottom-up initiative is tackling profound problems about the nature of evidence and technological solutions that all too frequently divide parties and lead to failure.

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[55] *Research influencing policy and practice.* Timperley, H. NRDC Lecture September 2007. Available from http://www.nrdc.org.uk/content.asp?CategoryID=436

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5　Steps to be taken

> *Research and development need to be organised in larger-scale programmes running over many years to ensure that expertise builds up and knowledge accumulates.*

So, having explored the multitude of issues about the role of evidence in educational practice and considered the way in which changes can be effected, what do we propose should be done about all this? What are the messages from this analysis?

Thinking
What seems to me to come first is the simplest idea. We need to *think* differently. Practitioners need to embrace evidence, researchers to think about the use of their work, managers and intermediaries to think about its role in institutions, policymakers to think about evidence for practice as well as policy. How do we do this? The answer is of course rather old-fashioned and unsurprising! We need to read, to talk, to discuss, and to write. We all need opportunities to think freely, away from the constraints and threats of codified professional life! We need to think more widely than education itself or even just the social sciences and social policy areas or just the UK. We need to open our thoughts to many fields of endeavour, many intellectual traditions and the experience of many nations.

Researching
We need to make changes in the way research is produced. Decisions about what is researched need to be open to a wider range of influences: problems in the practical world need greater priority particularly in relation to pedagogies for particular subject areas. Processes for establishing priorities collaboratively have been developed in some fields[56] and need to be developed in education.[57] Research and development need to be organised in larger-scale programmes running over many years to ensure that expertise builds up and knowledge accumulates. The design of programmes and projects needs to take into account the realities of the practical context in which the outcomes are to find their use. Plans for

impact need to be drawn up and end-users involved, so that those who are implicated feel ownership of the results.

Teamworking
More extensive R&D teamworking is needed: plurality is important in each community. Research needs multiple disciplines and methods; policymaking, collaboration between analyst and policymaker; practice, combinations of teachers, support staff and managers. Above all R&D teams need to combine people from each of these groups.

Changing the product
Greater imagination is needed about the form in which research is made manifest. Too many projects simply result in a report and perhaps an event to 'disseminate' it. It is no surprise that such minimal impact strategies simply address tiny specialist audiences and leave untouched the mass of end-users who might need to hear the message. Dissemination is simply the beginning of a strategy for active exploitation of knowledge.

Improving communications
Teamworking needs to extend to include the panoply of communication specialists who distil messages and get them out to the audiences that need to hear them. Publishing, journalism, video making, visual design, web design, events management are all key partners in making research count. They need to be respected and rewarded for their contribution to R&D programmes involved from the outset.

Enhancing local support
The local environment strongly influences whether or not practitioners make use of research evidence. The leadership of schools and colleges and the attitudes of local authorities are key influences and exert considerable control over the way budgets

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[56] See for example *Priority-setting for health technology assessment.* International Journal of Technology Assessment in Health Care 13:2 (1997) 144–185. CUP

[57] See for example a report on a NERF workshop on priority setting at http://www.standards.dcsf.gov.uk/nerf/word/WP6.2Prioritysettingworkshop.doc?version=1

are used. Some schools, colleges and local authorities have taken large strides in introducing research into their organisations and moving towards an evidence-using culture. Such a cultural shift can develop more widely, as leaders become more aware of its value. The majority will, I suspect, offer no great resistance to the idea of using research evidence more routinely but will want the benefits to be demonstrated as they adjudicate between competing claims for improvement action. The onus is on the promoters of evidence-based approaches to demonstrate their case, *in bottom-line terms.*

Combining development and research

D&R approaches that help overcome problems in more effective ways are beginning to happen, on topics ranging from reading schemes in infant schools, to numeracy for adults in the community. The key is to unlock resources by aligning research around a problem that is to be tackled and for which developmental resources have been allocated. A trial and error approach, involving just one or two enthusiasts, may be the starting point, but as others get interested improvements begin to show. The resources may gradually begin to appear from unexpected sources; the key is to demonstrate the return on investment in D&R in terms that are locally meaningful – reduction in bullying incidents, increased enrolments or higher reading scores.

Working with practitioners

There appears to be a growing interest amongst practitioners in research *per se* – both through masters and doctoral level courses and initiatives of national and local

organisations – yet a randomly chosen school or college is still unlikely to have an organised research or evidence using capacity. Steps need to be gradually taken to introduce research utilisation into the processes of teacher education, professional development and career advancement.

Providing tools

The infrastructure to support evidence use must continue to be built. Portals that help people gather evidence from multiple sources; systematic reviews that combine evidence from multiple studies; evidence-based materials that inform teachers' choices – all are needed. A vision of what could be achieved in education can be glimpsed in the websites of related fields – the Social Care Institute for Excellence, the National Institute for Health and Clinical Excellence, the Centre for Reviews and Dissemination, the Research in Practice partnership, for example. The challenge now is to develop, multiply and link together the resources for evidence in education to the point that they become part of the fabric of educational practice.

Conclusion

The way in which knowledge about educational practice is produced and put to use is a matter of the utmost public importance. It is also something for which no structure or agency exercises overall responsibility. Improvements in the system as a whole come from the actions of myriad organisations and individuals acting independently of one another. May they do so thoughtfully and purposefully, each aware of its profound dependence on the others.

CfBT Education Trust

Further Research Publications

Through the Evidence for Education programme, CfBT Education Trust is proud to reinvest its surpluses in research and development both in the UK and overseas.

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