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EDUCATIONAL RESEARCH AND DEVELOPMENT IN ENGLAND

EXAMINERS' REPORT

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NOTE BY THE SECRETARIAT

1.   This Examiners' Report on England is the second OECD review of a Member country's educational R&D policy. The first one was on New Zealand and was presented at the CERI Governing Board meeting in autumn 2001.

2.   In the preparatory work for the review, the Department of Education and Skills had prepared a Background Report on its educational R&D system.   The Background Report is available as CERI/CD(2002)11.

3.   The Background Report was a useful tool for the Review Team who interviewed educational researchers, teachers and policy-makers in education and research during their stay in England from 13-17 May 2002. The review team was composed of Professor Marshall Smith of Stanford University and the Hewlett Foundation and former Under Secretary of the US Department of Education; Deputy Director General Karen Nossum Bie, Norwegian Ministry of Education and Research; and Director Stefan Wolter, Swiss Co-ordination Centre for Research in Education.

4.   The aim of the national reviews of educational R&D systems is broader than a traditional R&D review, focusing on the quality of the research delivered. The focus is on an evaluation of the contribution of educational R&D to the knowledge base of education from which teachers and policy-makers can draw on. In line with OECD's overall mission, the reviews also address the issue of how education policies can be developed to support knowledge-based economies. OECD/CERI work on "The Knowledge Management in the Learning Society", strongly implies that educational policies, including those on R&D, need to be located within a broader context, with a particular concern for the way knowledge is generated, validated and utilised across organisations and sectors.

5.   At the CERI Governing Board, Professor Marshall Smith and Deputy Director General Karen Nossum Bie will present the examiners' recommendations for the England educational R&D systems, and a high-level representative from the Department for Education and Skills will respond to them. The OECD Secretariat will subsequently publish both the Examiners' and the Background Reports.

6.   The Governing Board is invited to:

NOTE the Examiners' and the Background Reports on England educational R&D systems;

COMMENT on the Examiners' and the Background Reports in the light of the presentations by the examiners and the England representative.

ADVISE on generic issues and findings of relevance to other Member countries in their efforts to reform their educational R&D systems.

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INTRODUCTION

7.   This review is the second OECD review of a Member country's educational R&D policy. The OECD's Centre for Educational Research and Innovation (CERI) has lengthy experience in analysing how to improve the knowledge base for educational practice and policy making. CERI has published a number of reports in this area, such as: *Educational Research and Development – Trends, Issues and Challenges* (1995), *Knowledge Bases for Educational Policies* (1996), *Knowledge Management in the Learning Society* (2000), and, most recently, in 2001, the "Examiners' Report on Educational Research and Development Policy in New Zealand".

8.   The review team was composed of Professor Marshall Smith of Stanford University and the Hewlett Foundation and former Under Secretary of the US Department of Education; Deputy Director General Karen Nossum Bie, Norwegian Ministry of Education and Research; and Director Stefan Wolter, Swiss Co-ordination Centre for Research in Education. Principal Administrator Kurt Larsen, CERI/OECD, assisted the review team. The review was carried out in England 12-17 May 2002.

9.   Members of the review team would like to thank all those who participated in the review visit and gave generously of their expertise and time. Special thanks go to Senior Advisor on Research at the Department for Education and Skills, Judy Sebba.

10.   The views expressed in the report are those of the members of the review team and not necessarily those of England, the OECD, or its Member countries.

EDUCATIONAL RESEARCH AND DEVELOPMENT IN ENGLAND: EXAMINERS' REPORT

PART I: OVERVIEW

Purpose

11.   This is the second OECD review of a Member country's educational R&D policy. The report has two goals. It reviews the policy of a specific country, England, and reaches some conclusions concerning that country. It also contributes to an emerging understanding of important educational R&D policy issues common to many OECD nations.

12.   Our statement of purpose for the review is taken from the report of the Department for Education and Skills (DfES), "Research and Development in England: Background Report Prepared for the OECD Review" (DfES, 2002), which states: "The purpose is to review the extent to which the educational R&D system within a country is functioning as an effective means for creating, collating and distributing the knowledge on which practitioners and policy can draw." Thus, the report may be viewed as an evaluation of the effectiveness of England's educational R&D system in developing and applying usable knowledge to improve the quality of educational practice and policy. To carry out the evaluation, we examined national policies and agendas for educational research and development, as well as the organisation and resources of the educational R&D system.

Approach and methodology

13.   The review team brings a variety of perspectives and experiences regarding educational R&D and national policies. Each of the reviewers has been actively involved in OECD activities for decades and all have served in positions of substantial responsibility in their nations' governments.

14.   The review team spent five days in England interviewing a wide variety of people in government and in groups actively involved in educational research and practice (see Appendix 1 for a complete list). Four days were spent in London in intensive meetings. The fifth was spent in Newcastle where we visited the School of Education and some very impressive classrooms at St. Thomas More School and Longbenton Community College. In preparing for the visit, we relied heavily on the Background Report and on other materials prepared by a wide variety of constituent groups.

15.   The complexity and breadth of the educational R&D system in England combined with the short period of time available for the study forced us to bring a great deal of humility to our task. Our review is a broad sweep through what we have identified as critical issues. It has not been the purpose of our review to focus on the quality of educational R&D in England, but to assess the government's R&D policies in the field of education. We cannot therefore generalise about specific areas of study, about the quality of R&D or even about research as a factor in the discussion of specific policies. We debated models for structuring our thoughts, formed impressions, tested ideas as we progressed through the week, brought our own experiences to organise the information we received, and have gone through a process of writing and rewriting our impressions and conclusions.

16.   Our interviews and the DfES Background Report concentrated on pre-collegiate education. Our focus has thus been almost exclusively on pre-collegiate education practice and policy. As a result, the review provides very limited analysis of higher and adult education. However, throughout the report we suggest that certain generic issues, such as accumulating knowledge, dissemination of research and research capacity are also relevant to tertiary and adult education.

Overall impressions

17.   We left England impressed in a number of dimensions. The quantity and quality of attention being paid to educational R&D by the government and to its potential contribution to the quality of policy and practice are remarkable, especially when contrasted with the other nations with which we are familiar. In terms of quantity, we were impressed by the breadth and scope of new efforts to improve the quality and relevance of R&D. We should remark, however, that the investment, while substantial in comparison with that of some other nations, pales when compared with the level of investment in other knowledge industries.

18.   Regarding the quality of attention to educational R&D, we found, among the people we interviewed, a striking level of understanding of research and of the government's attempts to improve the quality and utility of the R&D system. We also found a high degree of sophistication in the capacity of British social science to provide definitive evidence, as well as a refreshing lack of ideology in the discussions of research. Most of the interviewees seemed to understand that the improvement of education is a long-term process and that effective research can help steer this work in productive directions.

19.   We found strong support for efforts to improve the quality and utility of educational R&D and an interest in complementing the government's efforts with efforts from organisations such as the British Education Research Association (BERA) and the National Foundation for Educational Research (NFER) in the independent sector. There is clear evidence of interest in sustaining the push to improve and rationalise research and to evaluate the overall effort. We must note, however, that there is some resistance to the government's plans among constituents and producers of research. This resistance is considered below.

Organisation of the report

20.   The report has eight parts. This introductory part and the following two establish the context for our discussion. Part II reviews the current context of educational R&D in England and its recent history and concludes with some comparisons with educational R&D in other OECD countries. Part III introduces a model of an effective educational R&D system to guide our consideration of practice in England.

21.   The remaining five sections contain our analyses and conclusions about current R&D efforts. In Part IV, we begin with an assessment of the quality and usefulness of current educational research and some suggestions for improvement. Part V examines issues of accumulating and disseminating knowledge, and Part VI considers efforts to build R&D capacity, especially human capital. Part VII examines ways in which research might support England's educational reforms and proposes a set of strategies that might be followed. Part VIII brings together our conclusions and summarises our recommendations.

PART II: CONTEXT OF THE OECD REVIEW

22.   This part describes England's current educational R&D system. We start with a short description of the expenditures for educational R&D, examine the challenges to educational R&D in the recent past, and conclude with a consideration of recent changes resulting from efforts by the DfES and the research community to respond to the criticisms of the 1990s.

Current expenditures on education R&D in England

23.   The Background Report (DfES, 2002) and the R&D Funding Sub-group Report from the National Educational Research Forum (NERF, 2001b) set out current expenditures on educational R&D. Four sets of figures stand out:

- A recent NERF estimate indicates total expenditures of approximately GBP 70-75 million a year. This amounts to less than 0.5% of the annual total expenditure on education and is far less than the average spent on R&D in the business sector or other knowledge-dependent organisations. Comparisons with other countries are difficult, but OECD (1995) provides some indicators that may be used for comparison. The level of educational R&D as a percentage of total expenditure on education is on average less than 0.3% in six OECD countries for which data are available (Australia, Canada, Finland, Ireland, the Netherlands, Sweden). US expenditures on educational R&D are significantly larger in monetary terms but are probably somewhat less in terms of percentage of total expenditures on education. It is important to note that such figures do not include funded research addressing issues relevant to education carried out in other discipline-based departments, such as studies of "how children learn", "brain development" and "organisational research studies".

- A large share of educational R&D funds come from government spending through the Higher Education Funding Council for England (HEFCE) (60%); the Economic and Social Research Council (ESRC) (5%); and other federal agencies and local government (14%). Charities account for approximately 7% and the balance is made up of income from the European Union (EU) and other international projects, industry and other sources, including a wide range of private-sector educational and training organisations. The lack of strong participation by the private sector in funding educational research creates special responsibilities for government. Although professional organisations may help, the responsibilities of ensuring quality, relevance and transparency will inevitably rest heavily on the backs of the people and organisations that make the financial allocation decisions. Indeed the heaviest responsibilities are borne by HECFE, as illustrated by the fact that 60% of educational R&D funding is provided by the Council, while the Council's funding across scientific fields averages only 33% of the total R&D funding in those fields.

- By far the largest single source of government funds for research, the HEFCE administers from 2002-03 some GPB 940 million dedicated to research. For educational R&D the figure is approximately GBP 40 million, almost all of which goes to universities to distribute to their departments of education. Universities are awarded the resources on the basis of a Research Assessment Exercise (RAE) carried out by a subject panel of academics and users that takes place every fourth or fifth year. The last review took place in 2001 and will inform funding decisions from 2002-03. The RAE rates departments on the basis of the quality of their published research and consequently there is a heavy reliance on publications in peer-

reviewed journals. Universities have a great deal of flexibility in choosing how to spend the resources they receive from HEFCE e.g. they can provide extra resources for a subject they are keen to develop, or they may extract what amounts to a tax for overhead prior to allocating the funds to university departments.

− The NERF Sub-group Report estimates that 90% of educational R&D is carried out in university departments of education. While at least 100 separate institutions conduct education research, 80% of the funding from government, Research Councils and charities goes to 22 university departments or schools of education.

24. Two general conclusions stand out. One is that funding for educational R&D in England is small when education is compared with other knowledge-based sectors but probably not compared with other countries. The second is that resources for educational R&D are concentrated in university departments of education.

Challenges to educational R&D in England in the recent past

25. Over the past 20 years, the status of educational R&D in England, as determined by the government, has reached both a low and a high. Prior to the 1980s, much research, in particular action research, was promoted by organisations such as the Schools' Council and the Assessment Performance Unit. The low occurred in the 1980s during an era of educational reform that culminated in the adoption of a national curriculum. At the time, it was considered that educational R&D was unnecessary – the reformers believed that they already knew what they had to do to improve the quality of education. The formula was a national curriculum with clear standards, aligned assessments, reduction of regulations for schools, and accountability for results. In implementing these policies, the reformers expected the system to improve continuously, using assessment/accountability as a feedback mechanism to correct failures. Educational R&D in general received little government attention, and few resources were provided for research or evaluation addressing issues related to the implementation of the reforms.

26. By the middle of the 1990s, views had changed somewhat. Government officials found that implementation of the reforms had been more complex than expected, particularly in the area of classroom instruction. In 1995, the Teacher Training Agency (TTA) initiated an effort to characterise teaching as a research- or evidence-informed profession. In 1996, the TTA invited David Hargreaves to give their annual lecture. In his talk, "Teaching as a Research-based Profession: Possibilities and Prospects" (Hargreaves, 1996), Hargreaves' message was clear. He compared educational research with medical research and found educational research deficient in important dimensions: it was non-cumulative, not useful for improving schools and generally lacking in quality.

27. This view was not new, but the lecture was widely circulated and triggered a rash of writings, generally concurring with Hargreaves' conclusions, in scholarly and other settings (Tooley and Darby, 1998; Hillage *et al.*, 1998; Edwards, 2000). Tooley and Darby analysed the quality of published research. The Hillage *et al.* report, commissioned by the Department for Education and Employment (DfEE), analysed the funding and usefulness of educational research and was quite influential, Hillage *et al.* looked at how the system works and what impact it has. It concluded that the connections among research, policy and practice were weak; that research was too supplier-driven; that an emphasis on short-term evaluation, at the expense of exploration and development, led research to follow rather than lead policy; that studies examining practice were small-scale and unable to generate findings that could be generalised; that research findings were disseminated *ad hoc*; and that policy makers and practitioners lacked the capacity to use research when it was available. This sweeping indictment set the stage for a rash of policy changes.

The nature of R&D in England

28.   Some of these reviews traced the "inadequacy" of research to the process of funding research (through HEFCE). The distribution of funds to a small number of university education departments was seen as reinforcing small-scale basic research projects carried out by independent researchers on topics that are more appropriate for publication in refereed, high-quality journals than for addressing pressing problems of practice or policy. Some critics even saw the incentive system based on RAE as almost ensuring that knowledge deriving from the research would not be usable.

29.   In response, of course, the process was defended as ensuring that funds went to well-trained researchers who, to receive funds and later publish their findings, had to undergo rigorous peer review. Moreover, some of the funds went to strengthen fields such as history and philosophy, where it is more difficult to imagine research that is directly related to practice or policy. Finally, HEFCE policy and procedures were defended as protecting "blue sky" research, here understood as theoretical research with little obvious or immediate practical application for education but which might not be funded by a government that wanted only immediately useful R&D. "Blue sky" research may also be understood to mean an investigation that challenges the status quo or does not relate to current policy, and on this definition, the HEFCE distribution system may be less efficient.

30.   The challenge is to see how to balance "blue sky" (research with little practical application) with research that thoughtfully and rigorously addresses contemporary education problems. The research funded by HECFE, which makes up 60% of the total research outlays, may or may not address practical issues. Indeed, part of the problem is that there is no way of knowing what HEFCE money to universities is used for. However, the clear impression that we received was that the incentives that drive the allocation of HECFE funds operate to push HECFE research away from having a practical bent.   Fundamentally, the criticisms of the English educational R&D system in the late 1990s focused on the lack of usefulness of the research for informing policy development and practice. Figure A, taken from *Pasteur's Quadrant* (Stokes, 1997), focuses on the problem of usefulness and addresses the issue of research that is both basic (fundamental) and useful in terms of two dimensions, "quest for fundamental understanding" and "considerations of use".

Figure A: Pasteur's Quadrant

Consideration of Use

		Low	High
Quest for Fundamental Understanding	Yes	Pure Basic Research (Bohr) 1	Use-Inspired Basic Research (Pasteur) 2
	No	3	Pure Applied Research (Edison) 4

Source: Stokes, 1997.

31.   Stokes argues that basic research can be both "pure" and "use-inspired" and that many fundamental advances in science have been stimulated by applied problems. The fact that research is applied does not mean that it is also not basic. Quadrant 2, "use-inspired basic research", called "Pasteur's Quadrant", reflects his core argument, and the relative absence of educational research of this sort in England prior to the late 1990s appears to represent the central criticisms of Hargreaves and Hillage *et al*.

DfES's response to the critics

32.   In response to the criticisms, the DfES moved quickly to put into place an aggressive strategy to reform research policy and move it towards the kind of research that would fit in Pasteur's Quadrant. The Department's task, however, was and is difficult, because it has little influence over most government resources for educational R&D, which are mainly controlled by HECFE. Thus, the Department would use its resources to fund research to balance HECFE funding, to influence scholars' incentives to carry out research that would generate useful knowledge and to address issues related to the accumulation and dissemination of such knowledge.

33.   Given such constraints, DfES has generated an impressive record over the past few years. Some of its accomplishments are to have.

– Almost doubled DfES's research budget since 1997. Although the base was small (GBP 5-10 million), the direction and slope are positive.

– Established in September 1999, the National Education Research Forum to provide strategic direction for educational research. NERF has established a Funder's Forum to explore possibilities for greater collaboration between funders. The Forum proposes to establish an Education Priorities Group to develop a methodology and criteria for identifying priorities for
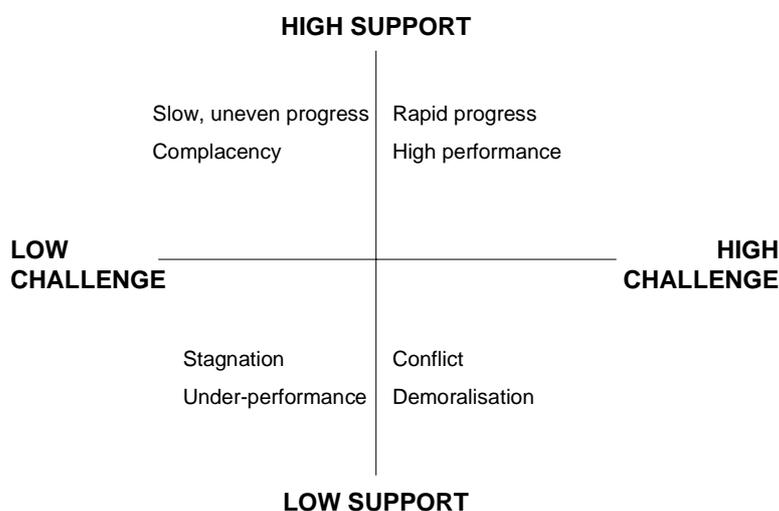
educational R&D. Furthermore, the Forum will establish an Education Observatory to examine current and emerging developments as well as medium- and longer-term trends likely to shape the future. The Observatory will also develop a method for setting research priorities (see Part IV).

−   Created and funded dedicated research centres for co-ordinated, systematic and "use-inspired basic research" focused on "wider benefits of schooling", the "economics of education", "information and communication technology", and "adult literacy and numeracy" (see Part IV).

−   Provided partial support for launching two major longitudinal studies, one on 14-21 year olds and the other on a cohort of 20 000 babies born between July 2000 and June 2001.

−   Provided funding for England's participation in international studies that provide benchmarks for assessing national progress.

−   Worked with HEFCE on the RAE to attempt to leverage funds to be more focused on useful research by influencing the criteria for judging research, and the balance of types (to include users) of reviewers and by working with journal editors (see Part V).

−   Worked with teachers and teacher unions on a variety of efforts to include information about problems of practice in research agendas. This has included setting up with the Teacher Training Agency a National Teacher Research Panel of teachers who advise on research issues. (see Part VI).

−   Addressed problems of accumulation of research information by setting up, supporting and accelerating the work of the Evidence for Policy and Practice Information and Co-ordinating (EPPI) Centre for carrying out systematic reviews in education (see Part V).

−   Leveraged funds from HEFCE money administered by ESRC to fund a coherent research programme focused on teaching and learning and to organise a network of researchers to focus on these issues (see Part VI).

Education reform in England

34.   The change in government policy, from almost ignoring educational R&D to embarking on a concerted effort to improve it, is reflected in other efforts throughout the government and a vigorous strategy to better implement educational reforms. Professor Michael Barber, the Prime Minister's Chief Advisor on Delivery, Cabinet Office, describes the changes in a paper delivered in Zurich in April 2002 (Barber, 2002). He emphasises that a primary goal of the current administration is better delivery of public services. Continuously improving the implementation of educational services, using better information about the effects and the needs of customers, is a critical component of this policy. Essential in this effort is greater access to effective and useful information gathered through research and evaluation and the strengthening of capacity in the delivery systems.

35.   Barber captures the past two decades of pre-collegiate education policy and the current direction of policy in the model in Figure B.

Figure B: Education Policy

HIGH SUPPORT

Slow, uneven progress	Rapid progress
Complacency	High performance

LOW CHALLENGE   **HIGH CHALLENGE**

Stagnation	Conflict
Under-performance	Demoralisation

LOW SUPPORT

Source: Barber, 2002.

36.   In brief, he argues that in the early years of the national curriculum reforms, the Conservative government moved from a system of low challenge and low support to a system of high challenge and low support. The Conservative government's answer to the "stagnation" of the system was new standards, new tests and accountability, but it invested insufficiently in the resources needed to support the move towards higher standards. According to Barber, "Nor was enough done to address the social circumstances which, particularly in declining industrial areas and large cities, made the job of educators daily more difficult. The result was some improvement but also conflict and demoralisation."

37.   The response to this analysis by the Labour government in 1997 was not to reduce the challenge but to increase support, creating a policy approach described by Barber as "high challenge, high support". Part of the increase in support was to promote and increase the quality and usefulness of educational R&D.

Effectiveness of educational R&D in other OECD countries

38.   Research evidence is used to support the improvement and reform of education in many OECD countries. In the United States, for example, the Clinton administration initiated standards-based reforms and pursued a policy of improving the implementation of government programmes. The Bush administration has continued the reforms while also advocating "evidence-based" policy making, especially in education. In France, a report on educational R&D from M. Antoine Prost to the Ministers of Education and Research (Prost, 2001) drew conclusions very similar to those of Hillage *et al*. Educational R&D in France was characterised as unco-ordinated, of limited use and often improperly assessed in terms of quality. This report led in late 2001 to several initiatives by the French Ministry of Education to strengthen the co-ordination of providers of educational R&D, train a new generation of education researchers and establish better dialogue between researchers and all actors in the education system. In Denmark, New Zealand, Scotland, Switzerland and Wales, similar discussions and initiatives are taking place. The fact that other nations are addressing such problems reinforces the importance of England's effort. It is important to note, however, that in England and other nations, the resources allocated to educational R&D are desperately small compared to the amounts allocated to R&D in other sectors. It is

ironic that the core societal institution for improving understanding and developing human capital receives one of the lowest allocations of funds for informing and advancing the field.

PART III: CONCEPTUALISATIONS OF AN EDUCATIONAL R&D SYSTEM

The national educational R&D system as a knowledge management system

39.   To structure our consideration of the England's educational R&D system, we decided to approach it as a knowledge management problem (OECD, 2000; 2002). In this context, the basic purpose of educational R&D is to develop, organise and disseminate information (knowledge) that illuminates our long-range understanding of fundamental processes of education. In the short term, it supports continuous improvement of the education system. The review team used two models to describe educational R&D and its place in the overall field of R&D.

40.   We also sketched out four dimensions of an educational R&D system. Together with the models, the four dimensions provide the structure for our analysis of England's system.

Basic and applied research

41.   One model, shown below in Figure C, is a wheel, with basic research in the centre and spokes representing areas of applied research. Basic research is typically defined as focusing on understanding fundamental laws and relationships and building theory, and is typically unconnected to immediate use. Applied research tackles understanding and solving practical problems. In the United States, the National Science Foundation would be located the middle of the wheel while applied research at the National Institutes of Health, the Office of Naval Research and the Office of Education Research and Improvement would be located on one or another of the spokes. In England, the same kinds of distinctions are made by HEFCE, by the Research Councils, which fund university-based basic and applied research, and by various departments of the government that fund applied research.

Figure C: Basic and Applied Research
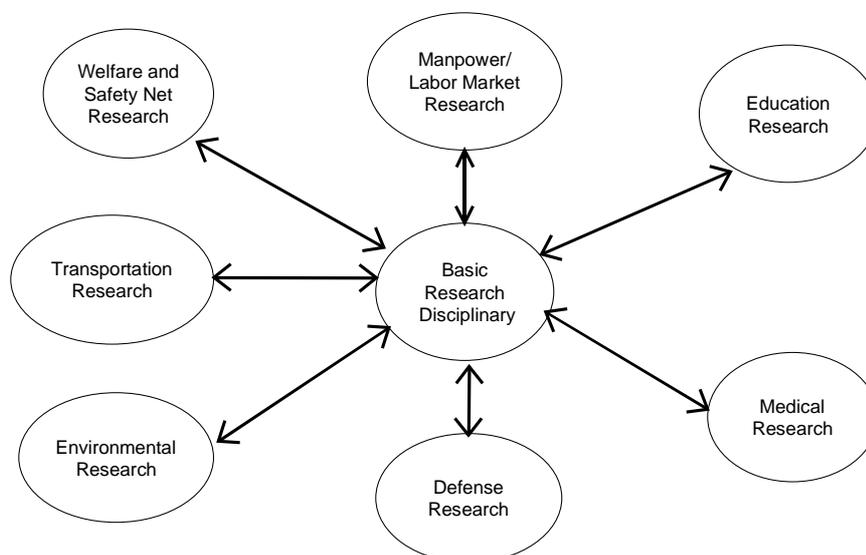
42.   Two observations are relevant. The first is that the arrows suggest that knowledge flows in both directions. This reminds us that applied educational research benefits from a wide variety of disciplinary research that is not labelled as educational research, such as studies of learning in psychology and neurobiology, organisation theory in sociology and the use of incentives in economics. The second observation is that in HEFCE's distribution of research funds for education, it is assumed that education is a discipline, and the funds are expected to be used for the development of theory and fundamental laws and relationships, (research in quadrant 1) rather than for developing a basic of understanding and solving problems of practice (quadrant 2) Although institutions determine the actual content of the research funded by HECFE the examiners reached a conclusion that the process and incentives embodied in the HECFE have a powerful influence that tilts research toward quadrant 1.

Interrelationships among basic research, applied research, interpretation and dissemination and policy and practice

43.   Figure D adds the categories of "interpretation and dissemination" and "policy and practice" to the R&D model. The figure suggests a somewhat linear process from basic to applied research to interpretation and dissemination, and finally to practice and policy within the national context. This linear model has been criticised as too simplistic. The double-headed arrows indicate the potential for feedback. While a complete model would be far more complicated, this one indicates the important feedback loop between applied R&D, on the one hand, and policy and practice, on the other. It also suggests that the process of interpretation (including synthesis) is crucial for taking applied research into the realms of policy and practice.

Figure D: Traditional Model R&D in a National Educational System

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┌─────────────────┐     ┌─────────────────┐     ┌─────────────────┐
│ Basic Research  │     │ Applied R&D     │     │ Interpretation  │────► Policy
│ Disciplinary    │     │                 │     │ and             │
│ Interdisciplinary│◄──►│ To understand   │◄──►│ dissemination   │
│                 │     │ and improve     │     │ of research     │
│ Knowledge and   │     │ existing        │     │ and             │
│ theory          │     │ educational     │     │ development     │
│ development     │     │ system          │     │ information     │────► Practice
│ with regard to  │     │                 │     │                 │
│ application or  │     │                 │     │                 │
│ use             │     │                 │     │                 │
└─────────────────┘     └─────────────────┘     └─────────────────┘
         ▲                       ▲
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┌─────────────────┐     ┌─────────────────┐
│ International Basic│◄──►│ International   │
│ Research        │     │ Applied Research│
└─────────────────┘     └─────────────────┘
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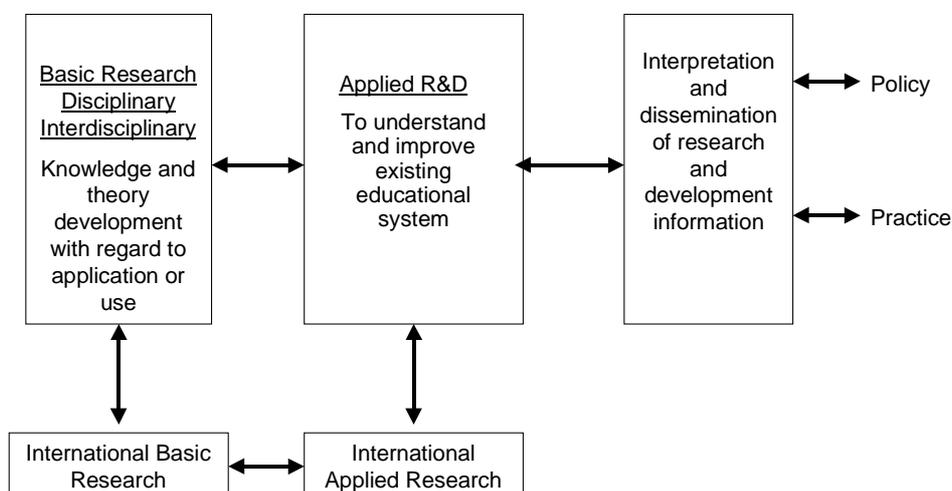
Dimensions for organising our thoughts about the R&D system

44.   Finally, as the review team considered the English system of educational R&D, we used some general criteria to structure our thinking. We did not attempt to apply these criteria to specific examples but used them in thinking about the nature of the R&D system. Four dimensions stood out: balance in the nature of the research; quality and availability; capacity; and the relationship of the research to school improvement and reform. These dimensions capture the basic ideas and suggestions that emerged from the variety of interviews that we carried out and are strongly represented in the Background Document and in the various documents that we perused during our week in England.

45.   In essence, we are asking a series of four questions: does the system produce applied as well as basic research? Is the knowledge developed by the system of high quality and is it available to potential users? Does the system have enough resources, including human resources, to meet the needs of its users effectively? Are products of the system useful for improving the effectiveness of schools? These questions, and the related four dimensions, form the organising concepts for the following four parts of the report.

PART IV: A BALANCED RESEARCH PORTFOLIO

46.   The efforts by DfES and others to reform the educational R&D system have been ambitious when compared with efforts in other OECD countries. Have they been ambitious enough to meet the

standard set by Barber (2002) in the title of his talk, "From Good to Great"? Probably not. Throughout the rest of the report, we look at various aspects of the R&D system and offer ideas about how to focus better on understanding, supporting and improving the English educational system.

Need for more research in Pasteur's Quadrant

47.   We start with the issue that seemed to dominate the criticisms of the 1990s. How can the educational R&D system stimulate and finance a greater amount of research that fits into Pasteur's Quadrant? Such research simultaneously addresses problems of practice and promises to develop knowledge that adds to our fundamental understanding of a phenomenon. A simple example is the question of the role of the size and complexity of a person's vocabulary and her/his comprehension of written text.

48.   The current government has made serious attempts to alter the balance between pure basic research and pure applied research and to emphasise use-inspired basic research. It has also made efforts to focus on issues of the quality and impact of research. The development of dedicated research centres and the ESRC's Programme on Teaching and Learning are two good examples. Perhaps the most important event has been the establishment of NERF (to bring together researchers and users of research and to help establish a research agenda that is politically independent). Independent and respected voices of this kind are crucial to the quality of the discussion about research. This is a very important body for improving the level of credibility necessary to change national policies for educational research. Once this is done, the long-term role of NERF is not clear; it might help to monitor the quality and usefulness of educational research.

49.   HEFCE has also made some small changes in its funding allocation priorities. In this area, users, teachers and other practitioners now have a greater voice in judgements about the quality of educational R&D and in the distribution of HEFCE funding. Finally, the DfES's discussions with journal editors about honouring research stemming from practice and the selection of reviewers are a promising move.

50.   Taken together, these and other efforts appear to have influenced the picture of the independent university researcher working alone on problems that are essentially unrelated to improvement of the current education system. But, this tradition is strong in English and other European universities and in the United States, and the faculty of Schools of Education often try to emulate their colleagues in the discipline faculties. Pressures to produce this kind of work are powerful and the incentives to change are weak. The culture of the university in this regard is reinforced by the way in which HEFCE funding is allocated, and by the prestigious journals in education, which often attempt to emulate discipline-based journals. These conditions are deeply entrenched in university culture and reinforced by professional norms. It may be possible to make changes to the way that HEFCE resources are distributed and to alter substantially some of the priorities of the journals, but it seems unlikely that it will be possible to change the basic structure of the university.

51.   One conclusion is that even if HEFCE funding were completely allocated according to criteria that reinforce practice-focused basic research, the norms and traditions of the university would still operate as a constraint on the nature and usefulness of the research. This is not to say that the research coming out of the universities is not important and useful – it is. However, the university is not conducive enough to large-scale problem-oriented work involving people working in teams, often in the field and at a considerable distance from the universities.

52.   It is too early to judge the quality and results of the research centres or the Teaching and Learning Programme and its associated network, but our sense is that these efforts are in the right direction. The

nation's portfolio could benefit from greater investments in long-term team-based and problem-based R&D.

53.   We have learned from experience in education and other areas that research carried out at centres can vary greatly in quality and coherence. However, centres focused on significant educational problems, with a clear mission and goals, strong theories of action and effective mechanisms of quality control, can produce very important and relevant research, as well as ensure dissemination. The most persuasive examples from the United States are the Learning Research and Development Center (LRDC) at the University of Pittsburgh, the Consortium for Policy Research in Education (CPRE) at the University of Pennsylvania, the Reading Center at the University of Illinois, the Wisconsin Center for Education Research (WCER) at the University of Wisconsin at Madison, and the Center for Research on Educational Standards and Testing (CREST) at UCLA. These centres represent a range of organisational structures. For example, CPRE is, in part, a virtual organisation, owing to its partnerships with Stanford, Harvard, the University of Michigan and the University of Wisconsin. Each of these institutions has a member on the centre's governing board, as well as separate sub-grants for projects suited to each institution's strength. CREST has co-directors from two universities almost 1 000 miles apart, while the Wisconsin centre houses a large variety of projects.

54.   As DfES works with its first round of centres, it would do well to develop careful evaluations and to ensure that each centre reflects upon its work. Refunding of centres is also an important decision and should entail a rigorous independent assessment. We also think it would be useful to begin to plan for a new round of centres to augment the existing set. NERF and the research community would likely play an important role as the missions for new centres are considered.

55.   A second important strategy is to adequately fund a small number of very ambitious, but carefully designed, studies to look closely at a difficult problem of practice. In the United States at the University of Michigan, Professors Steve Rodenbush, Deborah Ball and David Cohen are carrying out such a study with some funding from the federal government although private foundations are supplying most of the funding. They are conducting a seven- to nine-year study of how teachers can teach mathematics effectively in very low-income schools using a sample of close to 100 schools. Among other products, the study is creating some powerful instruments for assessing the quality of instruction in mathematics. We might imagine similar studies carried out in England. For example, one study might examine ways of improving professional development by focusing on effective use of formative assessments in elementary or middle schools (see Part VII).

56.   A third strategy is to create networks of researchers and practitioners around core problems of practice. Such networks can take a variety of forms, including a virtual structure using the Internet, satellite conferencing for formal or informal meetings.

PART V: ACCUMULATING AND DISSEMINATING KNOWLEDGE

57.   To make the best use of educational R&D in policy making and teaching practice, three problem areas have to be considered. First, existing research has to be inventoried and disseminated adequately. Barriers to accessing existing research hinder the impact that knowledge can have on policy making. Second, research itself suffers, if new research does not systematically take account of and build upon the

findings of earlier studies. To optimise the quality of ongoing research and increase the value added of new research, existing knowledge should be a basis for any new investment in research. A specific aspect of the non-cumulative nature of research in education is the fact that international research is often not taken into account. Third, to make the best use of the limited resources available for research, the focus should be sufficiently user-oriented and not just "supplier-driven". Successful management of research in education should therefore set framework conditions and incentives to make research easily accessible, cumulative in nature and focused on usefulness.

58.   A variety of initiatives have been implemented in the past to accumulate knowledge about research on education in a better way. For cumulative effect, it is important for information to be disseminated through all appropriate channels to make it as available as possible. The following sections examine the most important developments.

Documentation and dissemination

59.   Several institutions in England currently inventory research and disseminate research results to a broad public. These institutions can be divided into several groups according to their core mission and their specific method of inventorying or disseminating research. Traditional institutions, including universities and research institutions specialised in research on education, such as the National Foundation for Educational Research (NFER), all document and disseminate research results. Most of this activity is restricted to each institution's research, and dissemination is mainly oriented towards specific user groups.

60.   Among traditional institutions, specialised libraries also play an important role. The most important in this case is the British Education Index (BEI) based at the University of Leeds, which provides not only bibliographical information about research but also other resources for researchers. The Index office is increasingly diversifying its information services and is actively experimenting with customised delivery. Still, the traditional organisations mostly serve specialists and professionals, as access to the information remains difficult. Popularisation of research findings and transmission to a larger audience is currently supported by parts of the electronic and printed media.

61.   Although these institutions sometimes invest heavily in documentation and dissemination of research, some new institutions have also been created to serve this purpose. The new institutions complement existing organisations and primarily fill the gaps in coverage of the traditional ones. The most prominent new institutions are CERUK (Current Educational Research in the United Kingdom) and CUREE (Centre for the Use of Research and Evidence in Education).

62.   The DfES, the NFER and the EPPI Centre jointly developed CERUK. Researchers are the prime users of this freely accessible, Internet-based resource. The database holds information on current educational research projects undertaken in the United Kingdom, and the researchers themselves supply all the information in the database. Quality is therefore not a consideration for inclusion.

63.   CUREE is commissioned by the DfES to identify and summarise published research findings with particular users in mind (not specifically researchers), as well as to provide quality assurance. The summaries are longer than the information provided by CERUK and are written by specialists in web based communication whereas one of the aims of CERUK is complete coverage of current research in the United Kingdom. CUREE restricts itself to a small number of high-quality studies featured in research journals, that relate to issues identified as priorities by research users. The digests serve as standards for access to quality research and are also intended to encourage web oriented drafting by researchers. Information available from CUREE is disseminated on the Web site of the DfES.

64.   PERINE (Pedagogical and Educational Research Information Network for Europe), a project funded by the European Commission, is a new project that attempts to combine existing sources of information on research in education on an international platform. So far, PERINE has eight participating countries; it is headed jointly by the BEI and the German Institute for International Educational Research (DIPF). PERINE's main users will be researchers interested in knowing more about foreign research or conducting comparative analyses. The accumulation of "other national" knowledge (the purpose of PERINE) on one platform should also contribute to the accumulation of "national" knowledge within England. The establishment of PERINE is also a reaction to an increase in comparative research in education (infrastructure follows demand) and shows the need to examine national R&D policies in a more international framework.

Initiatives to make research more cumulative

65.   Considering the efforts made on different levels and by different stakeholders to improve and enlarge the documentation of research undertaken in the United Kingdom, we can assume that the biggest obstacles to cumulative research are being removed. However, we should not expect that these efforts alone guarantee that researchers and policy makers will take previous research into account when starting new research or developing new policy strategies. A good dissemination policy may also be an incentive to work cumulatively, as it raises the awareness of existing work among users and therefore the expectations attached to new research.

66.   As lowering the barriers to information will not be sufficient to change research behaviour on all fronts, DfES has taken action to put in place more powerful direct and indirect incentives that will have the desirable side effect of increasing cumulative research. Among the direct measures are systematic reviews of research in particular fields. The most notable indirect measures are changes in the funding mechanisms of research and changes in DfES's management of research and statistics.

67.   An important component of this effort is the EPPI Centre and the thematic reviews it undertakes to address education problems. Once a review in a certain field (or on a specific question) is completed, the review sets the basis on which new research will have to build. The higher the quality and the greater the dissemination of such reviews, the lower the probability of a researcher engaging in a new study without taking into account current knowledge, standards and methods.

68.   Funding mechanisms can play a central role in setting incentives for cumulative research. In this respect, the creation of the "Funders' Forum" may contribute to raising the quality of research. Co-ordination among funders can help to avoid double funding and perhaps spark competition among funders that will raise the pressure for higher quality and less redundant studies.

69.   Funding strategies may also lead to more cumulative research by concentrating research in fewer institutions. The RAE mechanism of funding clearly leads to a clustering and concentration of research in fewer universities. As a consequence, research may become more cumulative, as it will be less difficult to build on existing or ongoing research if most of the research is done in a small number of institutions than if it is scattered among a large number. The counter-argument is that there are often few experts in the same area in a single institution, and this may reinforce the traditional view of the independent researcher working on problems that are essentially unrelated to the current education system. The RAE may therefore encourage more cumulative research, but as we have seen in Part V, not necessarily the kind of research that is most needed, the use-inspired basic research of Pasteur's Quadrant.

70.   DfES's management of research also plays a central role in many other respects. One of its most powerful instruments is the "dedicated" research centre, in which research in a specific field is promoted in

a single entity. Here, the argument is the same as for the concentration of research in fewer institutions owing to a change in funding strategy. At the same time, the Department has seen the need to increase "in-house" knowledge in order to contract and supervise outside research more efficiently. Increased "in-house" knowledge is one key to improving the overall quality of research. Informed users will ask for higher quality and more focused research and will therefore be more selective in contracting researchers (Hillage *et al*., 1998). To this end, "the Centre for Management and Policy Studies in the Cabinet Office and the Civil Service College have developed a general programme for senior civil servants and ministers designed to promote a better understanding of evidence" (DfES, 2002, p. 8).

71.   DfES' management of statistical sources on education also plays an important role. Small-scale, non-repetitive investigations produce data sets that do not serve the purpose of cumulative research. Concentration on the production of freely accessible, large-scale data collection with the guidance of researchers is one positive step. Longitudinal surveys (the DfES currently supports ten longitudinal studies), cohort studies ("The Millennium Cohort" led by ESRC) and participation in international cross-country studies will further increase the move towards more cumulative research.

72.   61. As many researchers use longitudinal or cross-country data, this generates a culture of comparing analysis, methods and results and building upon others' knowledge.

Research between supply and demand

73.   Even where research is well-documented and cumulative, it may not focus on policy or users. Cumulative research may extend and improve what researchers have done in the past, but may not be in areas of high interest or priority for users. In such cases, we speak of "supplier-driven" research.

74.   Although a refocusing of research on user interests is observable, we argue that user-inspired basic research should be more strongly rewarded. However, users have to understand better how research works and accept the inherent long-term nature of research.

Reforms and proposed measures to improve the educational R&D system

75.   The policies observed in the areas of inventory/documentation, dissemination, improvement of quality and refocusing of research all represent positive changes in the landscape of research on education in England. Measures to improve the situation further should therefore focus primarily on sustaining these reforms, and in some cases, enlarging their scope. A prerequisite to the accumulation and dissemination of know-how is a freely accessible research database. However, access to free research literature is not guaranteed everywhere, and initiatives like the "Open Archives Initiative" (www.openachives.org) would deserve closer attention.

76.   As a result, while recognising the difficulties that still need to be addressed, the review team emphasises the value of the EPPI Centre. Building up the methodologies for scientific reviews, carrying out the reviews and exploiting the results for future research are the most important efforts currently needed for accumulating knowledge on educational research. To this end, the EPPI Centre should be supported on a long-term basis, if evaluation of its activities demonstrates that the centre is producing high-quality, effective work. In addition, making the EPPI activities broadly international in scope (perhaps by increasing collaboration with the Campbell Collaborative)could further increase the gain policy makers and the research community may expect from the EPPI Centre. If similar centres could be created in other countries and similar reviews conducted, the gain in knowledge would be greater and some economies of scale could be expected in terms of methodology.

77.   The role of the "dedicated" research centre is also very important, as it acts as an incubator for user-relevant research. To maintain quality in these centres, the DfES should give them a high degree of academic freedom, while keeping open the potential for competition among research institutions. The entry of alternative institutions should be considered periodically to ensure that current centres are under competitive pressure to create high-quality work. The DfES will have the difficult task of maintaining a balance between concentration of research and competition between institutions.

78.   In addition to efforts to improve the usability and quality of basic research, several programmes use practitioners (teachers and students) as researchers. To increase the capacity of practitioners to engage in research, DfES has created a support system via fellowships, grants, scholarships and special networks. It is evident that if research is to have an impact on practice in schools and classrooms, practitioners with experience in research are needed, but the link back to research is less evident. The efforts made in programmes using teachers as researchers should also generate information that can be fed back into more traditional forms of research. For this to happen, the management and overall design of practitioner research should be strengthened, and an investment should be made to synthesise these research findings and place them in a systematic and theoretical framework. Dissemination of research results (*e.g.* through teacher networks on the Web) should also be improved, with the condition that there should be some kind of quality control. The creation of a "mini" EPPI for practitioner research might be considered. The criteria for selection and retention of research results would probably be different from the current EPPI methodology and would need to be tailored to practitioner research. This would benefit interested users, university researchers and, above all, new practitioners who might engage in research and could build upon previous work.

79.   Finally, in the long term, good quality research that generates cumulative knowledge relies on the formation of a group of well-trained researchers. Part VI will examine this process by analysing capacity-building in English educational R&D.

PART VI: CAPACITY BUILDING

Increased focus on capacity building

80.   Capacity building among researchers, teachers and policy makers is becoming an important issue in the overall management of England's education system. Several recent initiatives and reports have focused on capacity building. A major capacity-building initiative is currently under way as part of the ESRC Teaching and Learning Research Programme. One of the capacity building initiative's goals is to widen the methodological approaches and encourage high-quality management of complex projects in educational R&D. Furthermore, NERF has established a sub-group on building research capacity, which defines research capacity as "the resources – material, human and intellectual – that are available in the education system for doing and for using research, together with the (more or less effective) ways in which those resources are brought to bear". We agree with this broad understanding of "capacity building" and suggest that it might be more helpful to think about "research capacities". For instance, the capacity to produce scholarly research is somewhat different from practitioners' capacity to produce and use research to inform their practice, which is also different from policy makers' capacity to use research. This suggests

that it is unlikely that a few simple measures would quickly increase the capacity of the educational R&D system.

81.   An important reason for the new focus on capacity building is the criticism made by researchers, policy makers and other users of educational research that the educational R&D system lacks the capacity to produce high-quality research relevant to users. The present government's emphasis on evidence-based policy also contributes to the need for good and relevant research. Many different national initiatives have been taken at different levels to improve research capacity. These initiatives address the key areas relevant to human capacity in the system: education researchers; users, including teachers; and government officials. Initiatives pertaining to each of these groups are discussed in this section, which ends with a set of conclusions.

Capacity building and education researchers

82.   We heard several times during our interviews about the difficult recruitment situation for talented young researchers and about the high average age (54 years old) of education researchers. Two-thirds of the current academic education research community are over 50 years old (DfES, 2002). Because of the age distribution, many researchers and teaching staff will retire in the coming years. Furthermore, education, like other academic disciplines, is facing increasing competition for talent from other knowledge sectors of the economy.

83.   A survey of the present recruitment situation in universities and colleges in the United Kingdom points to the fact that several academic fields, including education, face particular difficulties for recruiting academic staff. The report emphasises that the difficulties may intensify because of problems resulting from the current age profile of the workforce and the government's plans to expand higher education (HEFCE *et al.*, 2001).

84.   Trained personnel at the postgraduate and postdoctoral level are essential to maintain research capacity in education. While pointing to the value of the more traditional route through classroom and other relevant experience into educational research, the NERF sub-group report on research funding (2001b, p. 6), expresses concern that not enough young researchers are being attracted directly into educational research. According to the report, appropriate career path development is inadequate, although initiatives are being taken by ESRC and HEFCE to improve the situation.

85.   We recommend a detailed analysis of the overall recruitment situation in educational R&D. Although several reports over recent years have addressed the issue of "shortage" of highly qualified education researchers, none has come to a final conclusion concerning whether recruitment is a serious problem. For example, the latest paper to NERF on capacity building mentions that "there does seem to be some evidence that lack of capacity may be a problem in the development of the national strategy [for R&D]" (Dyson and Desforges, 2002). A study currently under way at the University of Cardiff on capacity building could provide a useful background for such an analysis.

86.   What is certain is the enormous need for new staff in education in universities and colleges over the coming years. This will also be an opportunity for renewal of staff in the field of educational research. It provides a chance to bring young researchers (with stronger methodological training) and researchers with different disciplinary backgrounds into educational research. Stipends for young Ph.D. students to spend time abroad or participate in international research projects would also contribute to capacity building and strengthen the internationalisation of educational research.

87.   One of the critical needs for new and experienced researchers is adequate training in quantitative and qualitatitive methodologies. We heard over and over about the lack of competent quantitative

researchers. Based on our review, much educational research is small-scale and qualitative in orientation. Comparatively little research is carried out using advanced quantitative methods that allow for large-scale and replicable research. While there are increasing opportunities to investigate large data sets, there are too few researchers with the necessary skills and experience. Furthermore, a combination of qualitative and quantitative methods is often required for research on complex issues in education, but too few researchers are sufficiently trained and experienced in both (DfES, 2002, p. 18). More training in well-designed experimental evaluation and systematic reviewing is needed. All this points to the need not only for strong methodological training for young researchers but also for professional development in these areas for some established education researchers.

88.   Some initiatives aim to improve the methodological training of education researchers. The ESRC is funding different types of initiatives that will benefit the field of education. For example, Ph.D. programmes now require initial master's level research training, and all funded students in master's programmes undertake training in a wide range of methodological and other research skills. Courses at the master's level are being funded for government researchers, and student research opportunities are specifically linked to capacity building in the field of large-scale surveys. The range of ESRC training courses is being increased and some Ph.D. funding is being allocated to research centres for quantitative approaches.A National Co-ordinating Centre for quantitative design is being established, and a new GBP 4 million Research Methods Programme has been announced. Generally, work involving large and complex data sets is being encouraged by the government (Gorard, 2002). Other positive developments are the fellowships initiated by the British Educational Research Association (BERA) for part-time Ph.D. study for practising teachers, local education authority staff and others, linked to the ESRC Teaching and Learning Programme and the possibility for Ph.D. students to be afffiliated with the dedicated research centres.

89.   As already mentioned, the ESRC Teaching and Learning Programme has capacity building in educational R&D as one of its objectives, and a special Capacity Building Network has been established at the Cardiff University School of Social Sciences to promote building capacity in research skills. Initiatives are varied and include training events, workshops and publications. These efforts are directed at both established researchers and students on different training programmes (master, Ph.D.).

90.   We believe that these initiatives will contribute to the improvement of the research capacity of education researchers. To secure expertise among future generations of researchers, however, the review team recommends including courses in research methodology as an obligatory part of Ph.D. training, thus building on the training received at the master's level. In this regard, the initiative of the NFER together with the University of London/Institute of Education, King's College London and the University of Oxford to establish an alternative route to the Ph.D. by way of an internship on a research project, deserves support.

Capacity building for evidence-based practice by teachers

91.   As early as 1995, the Teacher Training Agency started to develop strategies to promote teaching as a research-informed profession (DfES, 2002, p. 7). To improve teacher involvement in research, a number of scholarships, networks and schemes have been established by the DfES and by different organisations, such as the TTA Teacher Research Grant Scheme, the National Union of Teachers' Scholarships, the BERA fellowships, the DfES Best Practice Research Scholarships (BPRS) programme and the TTA school-based research consortia. The TTA and DfES set up the National Teacher Research Panel that has had a significant input on research commissioning, steering and dissemination. Initiatives such as these support teachers' continuing professional development. Teachers are able to carry out small-scale, classroom-based research projects supported by a mentor/researcher from a higher education

institution or a local education authority. The goal of these projects is to undertake enquiries into classroom practice, carry out investigations into teaching strategies and to share learning with colleagues. The National College of School Leadership is also promoting practitioner research through networked learning communities that enhance the professional development of teachers, including teachers' use of and involvement in research and evidence-informed practice is emphasised in management courses for teachers.

92.   Programmes promoting capacity building in research for teachers are important and should be further developed. Quality control, good design and good guidance by experienced researchers are prerequisites. Local universities' involvement in a mentor role in such programmes would help in this regard. Teachers are usually pressed for time, and special efforts have to be made to facilitate research-based practice in schools. To initiate and sustain the development of schools as research-aware and research-using organisations, school management needs to be supportive and teachers need to be given a leading role in producing and using educational research in the school. A critical mass of teachers needs to be involved. Extra resources and adequate management of the development process are essential.

93.   We saw impressive examples of TTA-supported networking in schools in Newcastle that are involved in small-scale research/investigations in co-operation with a local university department. The goal of these projects is to improve teaching methods and student learning.

94.   Teacher involvement in research and the interpretation of research results also requires competence in research methodology and statistics. Scholarships and bursaries for teachers should offer such training as part of continuing education. It is important to train the new generation of teachers to use research in their practice and teacher trainees should receive such training in their pre-service education programme. We have understood that this is not an obligatory part of initial teacher training, but that some departments of education have introduced such training as part of their programme. The fact that teacher training often is located within university departments of education should provide good opportunities for teacher trainees to participate in research projects and in lectures on research methodology, thereby strengthening new teachers' competence in research management and methodology.

Capacity building in government

95.   Since 1997, government departments in England have been involved in a modernisation process which has prompted the use of evidence-based policy. Special initiatives have been taken to promote better understanding of evidence and how it should be used, notably by establishing the Centre for Management and Policy Studies in the Cabinet Office (DfES, 2002, p. 8).

96.   Hillage *et al.* (1998) point to the absence of time and intermediary support to help ensure access to research results for policy makers and practitioners. As we have seen, the DfES has increased its budget for commissioning research outside the Department, as well as its internal research competence. This is improving the Department's capacity to engage with researchers, commission research and become a better and more critical user of research.

97.   Capacity is co-ordinated across government agencies working on educational research by a research liaison group established to ensure better co-ordination of research programmes and greater consistency in commissioning and quality control procedures. Also, organisations independent of government attend the liaison group's meetings once a year, thus widening possibilities for better co-ordination.

98.   A "culture" of evidence-based policy development is also built up in government departments because the Treasury Department, in its allocation of resources for new policy initiatives, often demands evidence that the proposed initiative will be able to achieve the specified policy goals.

99.   In our talks with research officers and senior civil servants in the DfES, we received the impression that more emphasis is now placed on the use of research evidence in designing new policy initiatives and making policy decisions. That is not to say, however, that every new initiative or decision is based on research evidence.

Conclusions

100.   The government has launched an impressive number of initiatives to increase research capacity among researchers, practitioners and policy makers. We agree with the directions and goals of the initiatives. A key question is whether these initiatives are not somewhat disconnected and therefore have only limited impact on education policy and practice, as mentioned in the latest paper to NERF on building research capacity (Dyson and Desforges, 2002).

101.   It is too early to offer a definitive answer to that question. More time is needed to evaluate these initiatives, and we are well aware that there are no "quick fixes" when the aim is to improve the research capacities not only of researchers, but also system-wide, including practitioners and policy makers involved with education. It is our general impression that the average teacher at the average school is largely unaware of the "teaching as a research-based profession" initiatives. At some point, the DfES will have to decide whether the Department and others should continue to offer a small number of teacher research grants or take more system-wide measures, such as rewriting teacher training standards or reconsidering teachers' conditions of employment and advancement. Such reflections would be crucial for support for educational reform through the research-based, continuous improvement strategy that is the focus of Part VII of this report.

PART VII: SUPPORTING AND IMPROVING THE REFORM OF EDUCATION THROUGH A RESEARCH-BASED CONTINUOUS IMPROVEMENT STRATEGY

102.   Over the past five years, England has embarked on an ambitious agenda to implement the national curriculum reforms of the late 1980s by focusing on using research to develop goals and incentives for the education system, as well ensuring that implementation is coherent and even creative (see the discussion of Figure B in Part II).

103.   In effect, the government has established a "theory of action" to guide its attempts to see England's educational system progress from "good to great". Fundamental to its goals is the development and implementation of a system of continuous improvement of education practice. Central components of its policies are "detailed teaching programmes based on best practice", good assessment data and clear targets, access to and use of best practice information, quality professional development, and effective intervention in the neediest schools. Each of these components should draw on research data.

104. This is a crucial and extraordinary challenge. Governments rarely spend much time thinking about implementation. They even more rarely announce that they intend to spend the resources necessary to understand how to improve implementation continuously.

Policy implementation with feedback loops

105. Figure E displays a model of policy implementation with R&D feedback loops. It describes relationships among policy, implementation/practice and research/evaluation. We are attempting to capture the sense of a strategy for the continuous improvement of implementation. In reality, of course, there are arrows from politics to implementation and evaluation as well as to policy development. But for the purpose of focusing attention on current efforts to move towards a "high challenge, high support" system, this model provides a basic understanding of feedback loops.

F i g u r e   E :   I m p l e m e n t a t i o n   o f   P o l i c y
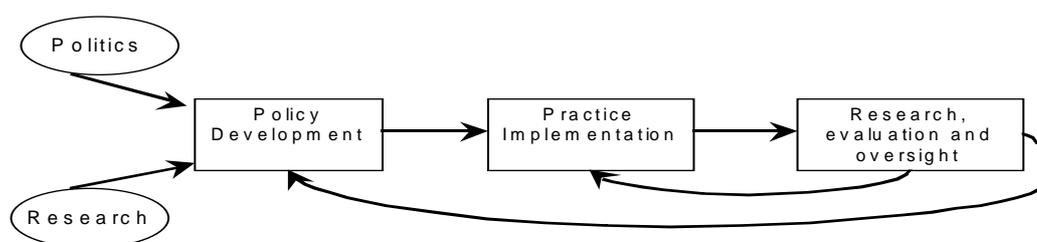
106. The government's simultaneous focus on evidence-based reform and improvement means that each of the components as well as the overall system of continuous improvement should draw on carefully amassed and organised research data. The review team believes that this presents a very important opportunity to demonstrate how research may be used to improve the quality of practice in an entire nation.

107. This work requires special attention to a variety of areas through research and development. For example, England has the opportunity not only to put high-quality assessments into practice for both summative and formative purposes but also to integrate both types of assessment. Formative assessments, in concert with examples of student work, would be a powerful means of guiding practice and informing parents, teachers and students about student and teacher success. At the same time, best practice strategies should be used to improve practice, based on the needs identified through analyses of formative assessments and student work. A second area for careful study would be the assessment of different strategies for devolving authority. What factors should influence the balance between top-down and bottom-up authority and responsibility? If we value devolution and believe it enhances performance, why do we abolish it when schools under-perform?

108. Systematic reviews and papers on best practice are important beginnings for the type of sustained and vigorous effort at understanding and improving implementation processes that we have in mind. The effort will be most important at two points: where students are most in need of special attention; and the point of interaction between teacher and student. At the heart of any improvement effort will be the

development of a systematic way to improve the quality of teaching continuously, particularly in low-income and under-performing schools.

109.   We would like to emphasise two possible important starting points for this work. One is the teacher as researcher project mentioned in Part VI, which we believe to be an excellent approach for encouraging teachers to think rigorously about their practice. The second is the strategy of formative assessment, which shows extraordinary results according to the systematic review of Black and Wiliam (1998). If these results withstand the scrutiny of careful review, the strategy of formative assessment could be used as the cornerstone of a process of continuous improvement of instruction across the nation. Significant implementation steps in this direction are already underway. All secondary schools in the nation have received materials, including video lessons, on the use of formative assessments. But, this is just a start. We can imagine a careful and well-funded body of R&D that embeds in the curriculum high-quality formative assessments (developed by teachers and researchers working together) and systematically seeks the most effective ways to administer and use this information to improve the quality of teaching. If the results lead from small studies to large-scale implementation, even at only the 75% level of effectiveness found by Black and Wiliam, the gains would be very substantial – in the neighbourhood of improvement of three-quarters to a full grade level.

110.   England has an opportunity to improve the quality and productivity of its educational system substantially. The opportunity has been created by the existence of a challenging and relatively young national curriculum and a government that understands the need to provide opportunity in order to have "fair" accountability. The first step is a commitment to using R&D to improve implementation of the education reforms at all levels of the education system: classroom, school, district and country. We believe England has taken this step. Should England be vigorous and successful in its efforts, it will set a standard for the rest of the world. A substantial part of the opportunity rests on the careful implementation of well-researched strategies for improving the quality of instruction in the schools. England has made a serious start in the right direction. It must continue to invest in thoughtful and user-oriented research, which offers new ideas and approaches and suggests ways of improving existing practice.

PART VIII: CONCLUSIONS AND SUMMARY OF RECOMMENDATIONS

111.   Our general assessment of England's educational R&D system is positive. Compared to other countries, there is remarkable support, both in quantitative and qualitative terms, of educational R&D and its potential contribution to the improvement of practice and policy within education. The directions taken in the many initiatives to improve the knowledge management of England's education system are convincing.

112.   Whether the commitments, ambitions and initiatives are enough to move the education system from "good to great" is, however, in question. Some of the ambitions behind continuous improvement of the knowledge base for England's education system will demand major knowledge and cultural changes in the practice of teachers, researchers and policy makers. Teachers need to look beyond their schools for evidence and think rigorously about their practice. Policy makers need to "value" and apply research evidence in policy development and implementation. Researchers must accept that the results of the traditional individual university researcher working on a self-defined, small-scale research project is unlikely to influence practice and policy in education. These cultural changes are beginning to take place

but are not occurring system-wide. We would like to suggest some recommendations that might help accelerate the necessary changes.

113.   Our specific recommendations fall under five main headings 1) changing the portfolio of research; 2) the role of NERF; 3) accumulating knowledge; 4) capacity building; and 5) system-wide improvement of the education system through research.

Recommendations

Changing the research portfolio

114.   We recommend creating a portfolio of research, in which more research would simultaneously address issues of practice or policy and issues of fundamental knowledge – that is, the research which falls into Pasteur's Quadrant (see Figure A). We believe that, if carefully carried out, three steps would ensure a strong and well-balanced research portfolio that would usefully serve to support England's educational system:

  – Ensure that NERF plays an active and productive role in developing research directions that illuminate issues of practice and policy.

  – Continue to work with HEFCE's RAE to reward university research that fits into Pasteur's Quadrant and to work with journal editors to publish high-quality examples of such work.

  – Continue to give high priority to using new research resources for large-scale research endeavours that focus on issues of practice and policy through the development of research centres, large-scale research projects and networks of researchers and practitioners that focus on understanding problems of policy and practice.

Continue the role of NERF

115.   We recommend that NERF should continue to have a strong advisory role in improving the overall educational R&D system. NERF plays the important role of bringing independent and respected researchers and practitioners together to help establish a research agenda that is unconstrained by governmental politics. Furthermore, it is a crucial body for gaining credibility for changes in the direction of national policy on educational research.

116.   NERF is a somewhat vulnerable body. It has almost no resources and no direct decision-making competencies and depends very much on the enthusiasm of its members and their contributions. This has worked well until now, as members are strongly committed to improve educational R&D in England. How can the positive momentum of the Forum be sustained? It might be worth reflecting on the role and composition of NERF in the longer term. The process for selecting members should be more transparent.

Increase the accumulation of knowledge

117.   We acknowledge that many important initiatives have been taken to improve R&D in the area of documentation, improvement of quality and refocusing of educational research. We therefore recommend that the main focus should be on sustaining these initiatives and in some cases enlarging their scope. In this context, we place high priority on the work of the EPPI Centre. It should be mandated on a long-term

basis, if an evaluation of its activities shows the organisation to be effective. Additionally, expanding EPPI activities internationally would increase the benefits researchers and policy makers can expect from the Centre. Furthermore, the creation of some "mini" EPPI for practitioners' research might be considered.

118.   We support the role of the new "dedicated" research centres, as they act as incubators for user-relevant research topics. To maintain the quality of these centres, and to inspire their creativity, the DfES should give them a high degree of academic freedom while keeping open the possibility of competition among research institutions, which would also involve all current centres bidding competitively for their continuation. The entry of alternative institutions should be considered periodically to keep the current centres under competitive pressure and ensure quality. These centres are in a strong position to ensure that the knowledge they produce is cumulative and stronger links should be made between the research centres, the EPPI centre and the National Educational Research Forum.

Increase research capacity

119.   We recognise the impressive number of initiatives undertaken to increase research capacities among researchers, practitioners and policy makers. We agree with the directions and goals behind these initiatives. There are no "quick fixes" when the aim is to improve the research capacities not only of researchers, but also system-wide. Programmes promoting capacity building in research for teachers are important and should be further developed, both through pre-service and in-service teacher training aligned on the goals of improvement initiatives.

120.   Given the high average age of education researchers, it will be necessary to recruit a large number of new researchers in education over the coming years. This provides an opportunity to bring young researchers from different disciplines with an improved training background into educational R&D. There are some indications that it is difficult to recruit young talented researchers for educational R&D. We therefore recommend carrying out a detailed analysis of the overall recruitment situation in educational R&D. More specifically, we recommend that high quality training programmes in research methods become an obligatory part of Ph.D. training.

System-wide improvement of the education system through research

121.   England is embarking simultaneously on a strategy of improving its education system and improving the capacity of its education R&D system. Its goal, as reported by Barber in conversation with the examiners, is to create, in effect, a process of "continuous improvement" at all levels of the education system: the classroom, the school, the district and the nation. We applaud this goal and urge that it be given a very high priority by the administration. We believe that this is a very important opportunity to demonstrate how research may be applied to improve education quality and practice in an entire country. It will be very interesting to follow these efforts, which will be most important where the students are most in need of special attention, particularly in low-income and under-performing schools.

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APPENDIX 1:

INTERVIEWED PERSONS

Professor Richard Andrews   University of York Department of Educational Studies/Universities Council for the Education of Teachers

Parin Bahl   Associate Director
                                         Strategic Education Services
                                         Capita

John Bangs   National Union of Teachers

Professor Michael Barber   The Prime Minister's Chief Adviser on Delivery
                                         Cabinet Office

Lorna Bertrand   Senior Executive Officer
                                         Assessment
                                         Department for Education and Skills

Audrey Brown   Divisional Manager
                                         Analytical Services
                                         Department for Education and Skills

David Budge   Deputy Editor (and research editor)
                                         Times Educational Supplement

Professor John Bynner   Centre for Wider Benefits of Learning (Institute of Education/Birkbeck College)

Peter Clark   Department for Education and Skills

Dave Clarke   Research Coordinator
                                         Longbenton Community College

Jim Cockburn   Principal
                                         Longbenton Community College

Professor Frank Coffield   University of Newcastle Department of Education

Dr Gavan Conlon   Centre for the Economics of Education
                                         London School of Economics
                                         Institute for Education/Institute for Fiscal Studies

Philippa Cordingley   Centre for the Use of Research and Evidence in Education

Professor Charles Desforges | Previously Director of ESRC Teaching and Learning Research Programme

Anne Diack | Research Manager
BBC Factual and Learning

Sue Duncan | Director of Policy Studies
Centre for Management & Policy Studies, Cabinet Office

John Dunford | General Secretary
Secondary Heads Association

Professor Alan Dyson | University of Newcastle Department of Education

Professor Anne Edwards | British Educational Research Association

Sir Brian Fender | Funders' Forum and former Chief Executive of HEFCE

Rhondda Garraway | Lecturer in pre-service training of FE teachers
University of Greenwich

Nigel Gee | Senior Research Officer
Analytical Services
Department for Education and Skills

Professor Stephen Gorard | University of Cardiff
Building Research Capacity Initiative, ESRC

Dr David Gough | EPPI Centre

Gary Grubb | Teaching and Learning Research Programme, ESRC

Professor David Hargreaves | Advisor to Secretary of State for Education
Former Professor at Cambridge University

Professor Seamus Hegarty | Director
National Foundation for Educational Research

Carolyn Holcroft | Continuing Professional Development
Department for Education and Skills

Professor David Hopkins | Head of the Standards and Effectiveness Unit
Department for Education and Skills

Rob Hull | Director (Qualifications & Young People)
Department for Education and Skills

Dr Mary James   Cambridge University
                                                Teaching and Learning Research Programme,
                                                ESRC

Paul Johnson   Chief Economist
                                                Department for Education and Skills

Tim Key   Head of Research
                                                Office for Standards in Education
                                                Department for Education and Skills

Pat Leon   Times Higher Educational Supplement

John Marshall   Head teacher
                                                St Thomas More School

Anne Mason   Team Leader
                                                School Inclusion
                                                Department for Education and Skills

Margaret McEvoy   Economic Adviser
                                                Evaluation Team
                                                Social Analysis & Research
                                                Department for Education and Skills

Julie McGrane   Teacher and Ph.D. student
                                                St. Thomas More School

Andrew Morris   R&D Manager
                                                Learning and Skills Development Agency

Kathy Murphy   Social Analysis & Research
                                                Department for Education and Skills

Professor Ann Oakley   EPPI Centre
                                                University of London, Institute of Education

Dr. Tim Oates   Head of Research
                                                Qualifications and Curriculum Authority

Sir Michael Peckham   Chair of the National Educational Research Forum

Professor Sally Power   Head of the Institute of Education's School of
                                                Educational Foundations and Policy Studies

Professor Gareth Rees   University of Cardiff
                                                Building Research Capacity initiative, ESRC

Charles Ritchie	Social Analysis & Research Department for Education and Skills
Dr Catrin Roberts	Assistant Director (Education) The Nuffield Foundation
Mary Russell	Universities Council for the Education of Teachers
Dr Lesley Saunders	Policy Adviser Research General Teaching Council
Professor Tom Schuller	Centre for Wider Benefits of Learning (Institute of Education/Birkbeck College)
Judy Sebba	Senior Advisor on Research Department for Education and Skills
Professor Geoff Southworth	Head of Research National College for School Leadership
Meryl Thompson	Head of Policy Association of Teachers and Lecturers
John Traxler	Centre for ICT in Education Delta Institute University of Wolverhampton
Professor James Tooley	University of Newcastle Department of Education
Michele Weatherburn	Senior Research Officer Analytical Services Social Analysis & Research Department for Education and Skills
Cherry White	Senior Support Officer (Research Team) Teacher Training Agency
Professor Geoff Whitty	Director of the London Institute of Education
Ian Wilkinson	Teacher St. Thomas More School
Ianthe Wright	Team Leader Teaching Assistants Department for Education and Skills
Martin Young	Headteacher Cranford Park Primary School

APPENDIX II:
LIST OF ABBREVIATIONS

BEI	British Education Index
BERA	British Educational Research Association
BPRS	Best Practice Research Scholarships
CERUK	Current Educational Research in United Kingdom
CPRE	Consortium for Policy Research in Education
CREST	Center for Research Educational Standards and Testing
CUREE	Centre for the Use of Research and Evidence in Education
DfEE	Department for Education and Employment
DfES	Department for Education and Skills
DIPF	German Institute for International Education Research
ESRC	Economic and Social Research Council
EPPI Centre	Evidence for Policy and Practice Information and Co-ordinating Centre
HEFCE	Higher Education Funding Council for England
LRDC	Learning Research and Development Centre
NERF	National Educational Research Forum
NFER	National Foundation for Educational Research
NRC	National Research Council
PERINE	Pedagogical and Educational Research Information Network for Europe
R&D	Research and development
RAE	Research assessment exercise

TTA   Teacher Training Agency

UCET   Universities' Council for the Education of Teachers

WCER   Wisconsin Center for Education Research